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ABSTRACT

This is a glossary of words that commonly appear in energy education and environmental education materials. With over 750 words ranging from "abatement" to "zooplankton" this publication includes some uncommon terms such as "anadromous," "film badge," "putrescible," and "tritium." Space is provided after each alphabetical section for the addition of words not included in the publication. This publication seems to have been written for use by upper elementary and junior high school students. The definitions are non-technical and, where appropriate, include comments on how the term relates to environmental issues. This glossary should also be useful to teachers. (MR)

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energy and environment glossary

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WHAT'S INSIDE? This is a glossary of energy and environmental terms. The words included are those which frequently appear in the popular literature, but with which many of us may be unfamiliar. Also included are those common words which have a special meaning when used in an energy or environmental context.

WHAT'S NOT INCLUDED? You will find that words commonly understood by nearly everyone have been omitted. On the other hand, in spite of our very best efforts, there are probably many words that have been simply overlooked. With that in mind, you will find space provided at the end of each section where you can add your discoveries. Please do! The glossary will grow and become more useful if you will send us your additions. There is a form at the end of the glossary for just that purpose.

HOW IS THE GLOSSARY ORGANIZED? The words are arranged alphabetically. Because energy and environmental terms are often closely interrelated, no effort has been made to separate them here.

WHAT CAN YOU DO WITH A GLOSSARY? Several rich possibilities immediately come to mind. First, this glossary is part of an interrelated group of instructional resources developed for teachers by Energy & Man's Environment. As an integral part of this program, the glossary provides quick access to many unfamiliar terms appearing in the related materials. Beyond this obvious use, however, aware and innovative teachers know that energy and energy-related environmental concerns are of considerable and growing interest to everyone, especially our students. As such, the glossary provides a useful resource and vehicle for teaching many basic skills. Hiding in this innocent volume are a wide variety of organizing, classifying, spelling and related learning opportunities. Please share your ideas with us so that we may pass them along to our teaching colleagues.

WHAT'S SPECIAL ABOUT THIS GLOSSARY? Well, a glossary is a glossary is a glossary . . . most of the time. It only becomes special (useful) when exercised as part of an intentional learning experience. This glossary is, however, an organized collection of many of the terms that are of growing importance in each of our lives. As we begin to carefully examine energy and energy-related environmental problems and issues within the security of our classrooms, this glossary will be a very useful (special) instructional tool.

WHAT WERE OUR SOURCES? The most fertile source of words, definitions and ideas were the writers (several), advisors (many), and critics (few), from government, industry and education who are sharing the work with the Energy & Man's Environment staff.

ABATEMENT: The act of reducing the degree or intensity of pollution.

ABSORPTION: The penetration of a substance into or through another. For example, in air pollution control, absorption is the dissolving of a soluble gas, present in an emission, in a liquid which can be extracted.

ACCELERATOR: In radiology, a device for imparting high velocity to charged particles such as electrons or protons. These fast particles can penetrate matter and are known as radiation.

ACCLIMATION: The physiological and behavioral adjustments of an organism to changes in its immediate environment.

ACCLIMATIZATION: The acclimation or adaption of a particular species over several generations to a marked change in the environment.

ACRE-FOOT: A volume of water one foot in depth covering an area of one acre.

ACTIVATED CARBON: A highly adsorbent form of carbon, used to remove odors and toxic substances from gaseous emissions. In advanced waste treatment, activated carbon is used to remove dissolved organic matter from waste water.

ACTIVATED SLUDGE: Sludge that has been aerated and subjected to bacterial action, used to remove organic matter from sewage.

ACTIVATED SLUDGE PROCESS: The process of using biologically active sewage sludge to hasten breakdown of organic matter in raw sewage during secondary waste treatment.

ACTIVATION: The process of making a material radioactive by bombardment with neutrons, protons, or other nuclear particles or photons.

ACUTE TOXICITY: Any poisonous effect produced within a short period of time, usually up to 24-96 hours, resulting in severe biological harm and often death.

ADAPTATION: A change in structure or habit of an organism that produces better adjustment to the environment.

ADSORPTION: The adhesion of a substance to the

surface of a solid or liquid. Adsorption is often used to extract pollutants by causing them to be attached to such adsorbents as activated carbon or cilica gel. Hydrophobic, or water-repulsing adsorbents, are used to extract oil from waterways in oil spills.

ADULTERANTS: Chemicals or substances that by law do not belong in a food, plant, animal or pesticide formulation. Adulterated products are subject to control by the Food and Drug Administration.

AERATION: The process of being supplied or impregnated with air. Aeration is used in waste water treatment to foster biological and chemical purification.

AEROBIC: This refers to life or processes that can occur only in the presence of oxygen.

AEROSOL: A suspension of liquid or solid particles in the air.

AFTERBURNER: An air pollution abatement device that incinerates products of combustion and removes undesirable organic gases through incineration.

AFTERCOOLING: The cooling of a reactor after it has been shut down.

AFTERHEAT: The heat produced by the continuing decay of radioactive atoms in a reactor after fission has stopped. Most of the afterheat is due to the radioactive decay.

AGRICULTURAL POLLUTION: The liquid and solid wastes from all types of farming, including runoff from pesticides, fertilizers and feedlots; erosion and dust from plowing, animal manure and carcasses and crop residues and debris.

AIR CURTAIN: A method for mechanical containment of oil spills. Air is bubbled through a perforated pipe causing an upward water flow that retards the spreading of oil. Air curtains are also used as barriers to prevent fish from entering a polluted body of water.

AIR MASS: A widespread body of air with properties that were established while the air was situated over a particular region of the earth's surface and that undergoes specific modifications while in transit away from that region.

AIR POLLUTION: The presence of contaminants in the air in concentrations that prevent the normal dispersive ability of the air and that interfere directly or indirectly with man's health, safety or comfort or with the full use and enjoyment of his property.

AIR POLLUTION EPISODE: The presence of abnormally high concentrations of air pollutants usually occurring during periods of low winds and temperature inversion, which may result in illness and death. See **INVERSION.**

AIR QUALITY CONTROL REGION: An area designated by the Federal Government where two or more communities - either in the same or different states - share a common air pollution problem.

AIR QUALITY CRITERIA: The levels of pollution and lengths of exposure at which adverse effects on health and welfare may occur.

AIR QUALITY STANDARDS: The prescribed level of pollutants in the outside air that cannot be exceeded legally during a specified time in a specified geographical area.

AIR SAMPLING: The collection and analysis of samples of air to measure its radioactivity or to detect the presence of radioactive substances, particulate matter or chemical pollutants.

ALGAL BLOOM: A proliferation of living algae on the surface of lakes, streams or ponds.

ALPHA PARTICLE: A positively charged particle emitted by certain radioactive materials. It is the least penetrating of the three common types of radiation (alpha, beta, and gamma) and usually not dangerous to plants, animals or man.

ALTERNATING CURRENT: An electric current whose direction of flow is charged at periodic intervals (many times per second).

AMBIENT AIR: Existing air.

AMMETER: An instrument for measuring the strength of an electric current.

ANADROMOUS: Type of fish that ascend rivers from the sea to spawn.

ANAEROBIC: Refers to life or processes that occur in the absence of oxygen.

ANTICOAGULANT: A chemical that interfers with blood clotting, often used as a rodenticide.

ANTI-DEGRADATION CLAUSE: A provision in air quality and water quality laws that prohibits further deterioration of air or water quality.

APPLIANCE SATURATION: Ratio of the number of homes using a specific appliance to the total number of homes.

AQUIFER: An underground bed or stratum of earth, gravel or porous stone that contains water.

AQUATIC PLANTS: Plants that grow in water either floating on the surface, growing up from the bottom of the body of water or growing under the surface of the water.

AREA SOURCE: In air pollution, any small individual fuel combustion source, including any transportation sources. Area Source is legally and precisely defined in Federal regulations. See **POINT SOURCE.**

ASBESTOS: A mineral fiber with countless industrial uses; a hazardous air pollutant when inhaled.

A-SCALE SOUND LEVEL: The measurement of sound approximating the auditory sensitivity of the human ear. The A-Scale Sound Level is used to measure the relative noisiness or annoyance of common sounds.

ASPHALT: A brown to black solid or semisolid bituminous substance manufactured or occurring in nature.

ASSIMILATION: Conversion or incorporation of absorbed nutrients into protoplasm. Also refers to the ability of a body of water to purify itself of organic pollution.

ATMOSPHERE: The air. The layer of gases surrounding the earth.

ATOM: The smallest part of any element that has the characteristics of that element.

ATOMIC PILE: A nuclear reactor.

ATTRACTANT: A chemical or agent that lures insects or other pests by olfactory stimulation.

ATTRITION: Wearing or grinding down by friction. One of the three basic contributing processes of air pollution, the others are vaporization and combustion.

AUDIOMETER: An instrument for measuring hearing sensitivity.

AUTOTROPHIC: Self-nourishing; denoting those organisms capable of constructing organic matter from inorganic substances.

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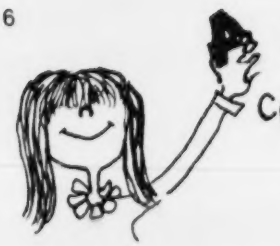

BACKGROUND LEVEL: Amount of pollutants present in the ambient air due to natural sources.

BACKGROUND RADIATION: Normal radiation present in the lower atmosphere from cosmic rays and from earth sources.

BACKSCATTER: When radiation of any kind strikes matter (gas, solid or liquid), some of it may be reflected or scattered back in the general direction of the source.

BACTERIA: Single-celled micro-organisms that lack chlorophyll. Some bacteria are capable of causing human, animal or plant diseases, others are essential in pollution control because they break down organic matter in the air and in the water.

BAFFLE: Any air deflector device used to change the direction of flow or the velocity of water, sewage or products of combustion such as fly ash or coarse particulate matter. Also used in deadening sound.

BAGHOUSE: An air pollution abatement device used to trap particulates by filtering gas streams through large fabric bags, usually made of glass fibers.

BALING: A means of reducing the volume of solid waste by compaction.

BAND APPLICATION: With respect to pesticides, the application of the chemical over or next to each row of plants in a field.

BAR SCREEN: In waste water treatment, a screen that removes large floating and suspended solids.

BARREL: A liquid volume measure equal to 42 U.S. gallons (159 liters).

BASAL APPLICATION: With respect to pesticides, the application of the pesticide formulation on stems or trunks of plants just above the soil line.

BASE LOAD: The average load in a stated period of time.

BEDROCK: The part of the earth's crust that is almost unbroken rock.

BENTHIC REGION: The bottom of a body of water. This region supports the benthos, a type of life that not only lives upon, but contributes to the character of the bottom.

BENTHOS: The plant and animal life whose habitat is the bottom of a body of water.

BERYLLIUM: A metal that when airborne has adverse effects on human health; it has been declared a hazardous air pollutant. It is primarily discarded by operations such as machine shops, ceramic and propellant plants and foundries.

BETA PARTICLE: An elementary negatively charged particle emitted by radioactive decay. It is easily stopped by a thin sheet of metal.

BIOASSAY: The employment of living organisms to determine the biological effect of some substance, factor or condition.

BIOCHEMICAL OXYGEN DEMAND (BOD): A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. Large amounts of organic waste use up large amounts of dissolved oxygen, thus the greater the degree of pollution, the greater the BOD.

BIODEGRADABLE: Having the potential of being broken down into small molecules by the action of living microorganisms including bacteria and fungi.

BIOLOGICAL CONTROL: A method of controlling pests by means of introduced or naturally occurring predatory organisms, sterilization or the use of inhibiting hormones, etc., rather than by mechanical or chemical means.

BIOLOGICAL DOSE: The radiation dose absorbed in biological material. Measured in rems.

BIOLOGICAL HALF LIFE: The time required for a biological system, such as a human or animal, to eliminate by natural processes half the amount of a substance (such as a radioactive material) that has entered it.

BIOLOGICAL OXIDATION: The process by which bacterial and other micro-organisms feed on complex organic materials and decompose them. Self purification of waterways and activated sludge and trickling filter waste water treatment processes depend on this principle. The process is also called biochemical oxidation.

BIOLOGICAL SHIELD: A mass of absorbing material placed around a reactor or radioactive source to reduce the radiation to a level safe for humans.

BIOME: A large geographic area which has the same general type of climate, plant and animal life.

BIOMONITORING: The use of living organisms to test the suitability of effluent for discharge into receiving waters downstream from a discharge.

BIOSPHERE: The portion of the earth and its atmosphere capable of supporting life.

BIOSTABILIZER: A machine used to convert solid waste into compost by grinding and aeration.

BIOTA: All the species of plants and animals occurring within a certain area.

BIOTIC COMMUNITY: A group of plants, animals, and microbes living together and depending on each other for food, shelter, etc.

BITUMINOUS COAL: "Soft coal," coal containing between 15 and 50 per-cent volatile matter.

BITUMINOUS ROCK: A rock containing hydrocarbons or bituminous material.

BLOOM: A proliferation of living algae and/or other aquatic plants on the surface of lakes or ponds.

BLOWDOWN: Water drawn from boiler systems and cold water basins of cooling towers to prevent buildup of solids concentrations. Usually contains chemicals used for pH adjustment and slime control.

BOD: See **BIOCHEMICAL OXYGEN DEMAND.**

BOD_5: The amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter in effluent. See **BIOCHEMICAL OXYGEN DEMAND.**

B.O.E.: Barrel of Oil equivalent; a unit of energy equivalent to the energy in a barrel of crude oil or 5,800,000 BTU's.

BOG: Wet, spongy land usually poorly drained, highly acid and rich in plant residue.

BOILING: The process that changes liquid to gas in which bubbles of gas form below the surface of the liquid.

BOILING POINT: The temperature at which a liquid boils.

BOILING WATER REACTOR: A reactor in which water, used as both coolant and moderator, is allowed to boil in the core. The resulting steam can be used directly to drive a turbine.

BOOM: A floating device that is used to contain oil and other floating matter on a body of water.

BOTANICAL PESTICIDE: A plant-produced chemical used to control pests (e.g.: nicotine, strychnine or orpyrthrun.)

BRACKISH WATER: A mixture of fresh and salt water.

BREEDER: A nuclear reactor that produces more fuel than it consumes.

BREEDER REACTOR: A nuclear reactor that creates more fissionable fuel than it consumes.

BREEDING RATIO: The ratio of the number of fissionable atoms produced in a breeder reactor to the number of fissionable atoms consumed in the reactor.

BRITISH THERMAL UNIT (BTU): The standard unit for measurement of the amount of heat energy, such as the heat content of fuel. Equal to the amount of heat energy necessary to raise the temperature of one pound of water one degree Fahrenheit. [3.968 BTU's per kilocalorie (100 calories)].

BROADCAST APPLICATION: With respect to pesticides, the application of chemical over an entire field, lawn or other area.

BURIAL GROUND (Graveyard);
RSSF (Retrievable Surface Storage Facility): A place for burying unwanted radioactive materials to prevent radiation escape, earth or water acting as a shield. Such materials must be placed in watertight, noncorrodible containers so the radioactive material cannot leak out and invade underground water supplies.

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CADMIUM: See **HEAVY METALS.**

CALORIE: Unit of quantity of heat. The amount of heat required to raise the temperature of 1 kilogram of water 1 degree Centigrade .

CANCER: A disease in which cells multiply in an uncontrolled way.

CAPABILITY: The maximum load which a generator, turbine, power plant, transmission circuit, or power system can supply under specified conditions for a given time interval without exceeding approved limits of temperature and stress.

CAPACITY: The load for which a generator, transmission circuit, power plant, or system is rated. Capacity is also used synonymously with capability.

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CARBON DIOXIDE (CO_2): A colorless, odorless, toxic gas that is a normal part of the ambient air. CO_2 is a product of fossil fuel combustion.

CARBON MONOXIDE (CO): A colorless, odorless, highly toxic gas that is a normal byproduct of incomplete fossil fuel combustion. CO, one of the major air pollutants, can be harmful in small amounts if breathed over a certain period of time.

CARCINOGENIC: Cancer producing.

CARNIVORE: A meat-eating animal.

CASK: A container used for the safe transportation of radioactive materials.

CATALYTIC CONVERTER: An air pollution abatement device that removes organic contaminants by oxidizing them. Can be used to reduce nitrogen oxide emissions from motor vehicles.

CAUSTIC SODA: Sodium hydroxide (NaOH), a strongly alkaline, caustic substance used as the cleaning agent in some detergents.

CELLS: With respect to solid waste disposal, earthen compartments in which solid wastes are dumped, compacted and covered over daily with layers of earth.

CELSIUS: A metric temperature scale on which the freezing point of water is 0 degrees and the boiling point of water is 100 degrees.

CENTRIFUGAL COLLECTOR: Any of several mechanical systems using centrifugal force to remove particles from a gas stream.

CFS: Cubic feet per second.

CHAIN REACTION: A reaction that stimulates its own repetition. In a fission chain reaction, a fissionable nucleus absorbs a neutron and fissions, releasing additional neutrons. These in turn can be absorbed by other fissionable nuclei, releasing still more neutrons. A fission chain reaction is self-sustaining when the number of neutrons released in a given time equals or exceeds the number of neutrons lost by absorption in non-fissioning material or by escape from the system.

CHANNELIZATION: The straightening and deepening of streams to permit water to move faster, to reduce flooding or to drain marshy acreage for farming. However, channelization reduces the organic waste assimilation capacity of the stream and may disturb fish breeding and destroy the stream's natural beauty.

CHEMICAL ENERGY: The kind of energy that may be released when a chemical reaction takes place.

CHEMICAL FERTILIZER: Inorganic plant food.

CHEMICAL OXYGEN DEMAND (COD): A measure of the amount of oxygen required to oxidize organic and oxidizable inorganic compounds in water. The COD test, like the BOD test, is used to determine the degree of pollution in an effluent.

CHEMICAL REACTION: A chemical change.

CHEMICAL SHIM: Chemicals, such as boric acid, which are placed in a reactor coolant to control the reactor by absorbing neutrons.

CHEMOSTERILANT: A pesticide chemical that controls pests by destroying their ability to reproduce.

CHILLING EFFECT: The lowering of the earth's temperature due to the increase of atmospheric particulates that inhibit penetration of the sun's energy.

CHLORINATED HYDROCARBONS: A class of generally long-lasting, broad-spectrum insecticides of which the best known is DDT, first used for insect control during World War II. Other similar compounds include aldrin, dieldrin, heptachlor, chlordane, lindane, endrin, mirex, benzene hexachloride (BHC), and toxaphene. The qualities of persistence and effectiveness against a wide variety of insect pests were long regarded as highly desirable in agriculture, public health and home uses. Later research has revealed that these same qualities may represent a potential hazard through accumulation in the food chain and persistence in the environment.

CHLORINATION: The application of chlorine to drinking water, sewage or industrial waste for disinfection of undesirable compounds.

CHLORINATOR: A device for adding a chlorine-containing gas or liquid to drinking or waste water.

CHLORINE-CONTACT CHAMBER: In a waste treatment plant, a chamber in which effluent is disinfected by chlorine before it is discharged to the receiving waters.

CHLOROPHYLL: The chemical substance that gives green plants their color and helps them carry on photosynthesis.

CHLOROSIS: Yellowing or whitening of normally green plant parts. It can be caused by disease organisms, lack of oxygen or nutrients in the soil or by various air pollutants.

CHROMIUM: A heavy metal.

CHRONIC: Marked by long duration or frequent recurrence.

CIRCUIT: The complete path traversed by an electric current.

CIRCUIT BREAKER: An automatic switch which breaks the circuit when too much electricity is flowing. It is similar to a fuse, but it can be reused.

CLADDING: The outer jacket of nuclear fuel elements. It prevents corrosion of the fuel by the coolant and the release of fission products into the coolant. Aluminum or its alloys, stainless steel and zirconium alloys are common cladding materials.

CLARIFICATION: In waste water treatment, the removal of turbidity and suspended solids by settling, often aided by centrifugal action and chemically induced coagulation.

CLARIFIER: In waste water treatment, a settling tank which mechanically removes settleable solids from wastes.

COAL: A solid, combustible, organic hydrocarbon formed by the decomposition of vegetable material without free access to air.

COAL GAS: An artificial gaseous fuel produced by heating coal in the absence of oxygen. This fuel, known as manufactured gas, can supply about 450 BTU per standard cubic foot. Use of coal gas in the U.S. ceased when inexpensive natural gas became widely available. Usually toxic if inhaled.

COAL GASIFICATION: The conversion of coal to a gas suitable for use as a fuel.

COASTAL ZONE: Coastal waters and adjacent lands.

COD: See **CHEMICAL OXYGEN DEMAND.**

COEFFICIENT OF HAZE (COH): A measurement of visibility interference in the atmosphere.

COFFIN: A container used for the safe transportation of radioactive materials.

COLIFORM INDEX: An index of the purity of water based on the count of its coliform bacteria.

COLIFORM ORGANISM: Any of a number of organisms common to the intestinal tract of man and animals whose presence in waste water is an indicator of pollution and of potentially dangerous bacterial contamination.

COMBINED SEWERS: A sewerage system that carries both sanitary sewage and storm water runoff. During dry weather, combined sewers carry all waste water to the treatment plant. During a storm, only part of the flow is intercepted because of plant overloading; the remainder goes untreated to the receiving stream.

COMBUSTION: Burning. Technically, a rapid oxidation accompanied by the release of energy in the form of heat and light. It is one of the three basic contributing factors causing air pollution, the others are attrition and vaporization.

COMMINUTION: Mechanical shredding or pulverizing of waste, a process that converts it into a homogeneous and more manageable material. Used in solid waste management and in the primary stage of waste water treatment.

COMMINUTOR: A device that grinds solids to make them easier to treat.

COMPACTION: Reduction of bulk or solid waste by rolling or tamping.

COMPOST: Relatively stable decomposed organic material.

COMPOSTING: A controlled process of degrading organic matter by microorganisms. (1) mechanical—

a method in which the compost is continuously and mechanically mixed and aerated. (2) ventilated cell—compost is mixed and aerated by being dropped through a vertical series of ventilated cells. (3) windrow—an open-air method in which compostable material is placed in windrows, piles or ventilated bins or pits and occasionally turned or mixed. The process may be anaerobic or aerobic.

CONDENSATE: Known sometimes as distillate. A heavier liquid hydrocarbon occuring usually in gas reservoirs of great depth and high pressure.

CONDENSATION: The change from gas to liquid.

CONDENSER COOLING WATER: Water required to condense the steam after its discharge from a steam turbine.

CONDUCTION: The transmission of energy through a material.

CONDUCTION, THERMAL: The transmission of heat through a substance from places of higher to places of lower temperature.

CONDUCTOR, ELECTRICAL: Body capable of carrying an electrical current.

CONSERVATION: The care or preservation of natural resources.

CONSERVE: To manage or use wisely.

CONTACT PESTICIDE: A chemical that kills pests on contact with the body, rather than by ingestion (stomach poison).

CONTRAILS: Long narrow clouds caused by the disturbance of the atmosphere during passage of high-flying jets.

CONTAINMENT VESSEL: A gas tight shell or other enclosure around the reactor.

CONTRACT DEMAND: The demand that the supplier of electric service agrees to have available for delivery.

CONTROL ROD: A rod, plate, or tube containing a material that readily absorbs neutrons (hafnium, boron, etc.), used to control the power of a nuclear reactor. By absorbing neutrons, a control rod prevents the neutrons from causing further fission.

CONVECTION: The movement of heat through a liquid or gas in currents of the substance.

CONVENTIONAL HYDROELECTRIC PLANT: A hydroelectric power plant utilizes streamflow only once as the water passes downstream, as opposed to a pumped-storage plant which recirculates all or a portion of the streamflow in the production of power.

CONVERSION RATIO: The ratio of the number of atoms of new fissionable material produced in a converter reactor to the original number of atoms of fissionable fuel consumed.

COOLANT: A substance circulated through a nuclear reactor to remove or transfer heat. Common coolants are water, heavy water, air, carbon dioxide, liquid sodium and sodium-potassium alloy.

COOLING TOWER: A device used to cool power plant condensor water before it is returned to lake, river, or ocean. The cooling tower is intended to prevent thermal pollution.

COOLING WATER CONSUMPTION: The cooling water withdrawn from the source supplying a generating plant which is lost to the atmosphere. Caused primarily by evaporative cooling of the heated water coming from the condenser. The amount of consumption (loss) is dependent on the type of cooling employed—direct (once-through) cooling pond, or cooling tower. When not returned to the source of supply, blowdown is also included as a consumptive loss.

COOLING WATER LOAD: Waste heat energy dissipated in the cooling water.

COOLING WATER REQUIREMENT: The amount of water needed to pass through the condensing unit in order to condense the steam to water. This amount is dependent on the type of cooling employed and water temperature.

COOPERATIVES (COOPERATIVELY-OWNED ELECTRIC UTILITIES): A group of persons who have organized a joint venture for the purpose of supplying electric energy to a specified area. Such ventures are generally exempt from the Federal Income tax laws. Most cooperatives have been financed by the Rural Electrification Administration.

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COORDINATED COLUMBIA RIVER SYSTEM: Contractually, the system of hydroelectric projects located on the Columbia River and major tributaries which are operated together on a coordinated basis under the terms of the Pacific Northwest Coordination Agreement.

CORE: The center of a nuclear reactor where fuel assemblies are located.

COSMIC RAYS: Radiation of many sorts but mostly atomic nuclei (Protons) with very high energies, originating outside the earth's atmosphere. Cosmic radiation is part of the natural background radiation. Some cosmic rays are more energetic than any man-made forms of radiation.

COVER MATERIAL: Soil that is used to cover compacted solid waste in a sanitary landfill.

CRITICAL: Capable of sustaining a chain reaction.

CRITICAL HYDRO PERIOD: Period when the limitations of hydroelectric power supply due to water conditions are most critical with respect to system load requirements.

CRITICAL MASS: The mass of fissionable material that will support self-sustaining chain reaction.

CRUDE OIL: Petroleum liquids as they come from the ground. Petroleum liquids were formed from animal and vegetable material which collected at the bottom of ancient seas.

CRUST: The solid, cool exterior of the earth.

CULTURAL EUTROPHICATION: Acceleration by man of the natural aging process of bodies of water.

CURIE (Ci): A measure of radioactivity. Any quantity of radioactive material in which 37 billion atoms are disintegrated every second is said to have an activity of 1 curie.

CYCLE: A set of changes through which certain materials go, which leads back to an original form.

CYCLONE COLLECTOR: A device used to collect large-size particulates from polluted air by centrifugal force.

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DDT: The first of the modern chlorinated hydrocarbon insecticides whose chemical name is 1,1,1-tricholoro-2,2-bis (p-chloriphenyl)-ethane. It has a half-life of 15 years, and its residues can become concentrated in the fatty tissues of certain organisms, especially fish. Because of its ability to accumulate and magnify in the food chain, EPA has banned the registration and interstate sale of DDT for nearly all uses in the United States effective December 31, 1972.

DECAY: The action of bacteria and fungi that use organic matter as food and break it down into smaller molecules.

DECAY, RADIOACTIVE: The spontaneous transformation of one nuclide into a different nuclide or into a different energy state of the same nuclide. The process results in a decrease, with time, of the number of the original radioactive atoms in a sample.

DECIBEL: A unit used for measuring the intensity of sounds. (dB)

DECOMPOSE: When a dead body or wastes of an animal, plant or human rots slowly and then disappears.

DECOMPOSER: Microorganisms that aid in the breakdown or "rotting" of wastes.

DECOMPOSITION: Reduction of the net energy level, structure, and change in chemical composition of organic matter because of the actions of aerobic or anaerobic microorganisms.

DEGREE DAY: A term which is used to determine a heat requirement for a specified period of time.

DEMAND: The requirement for electric energy to be delivered by a system at a given instant or averaged over any designated period of time, expressed in kilowatts or other suitable units.

DENSITY: The mass of a substance divided by its volume. A substance of high density is said to be DENSE.

DERMAL TOXICITY: The ability of a chemical to poison an animal or human by skin absorption.

DESALINIZATION: Salt removal from sea or brackish water.

DESICCANT: A chemical agent that may be used to

remove moisture from plants or insects causing them to wither and die.

DETERGENT: Synthetic washing agent that, like soap, lowers the surface tension of water, emulsifies oils and holds dirt in suspension. Environmentalists have criticized detergents because most contain large amounts of phosphorus-containing compounds that contribute to the eutrophication of waterways.

DEUTERIUM: A form of hydrogen atom in which the nucleus contains one proton and one neutron. About 0.0156% of all hydrogen atoms have such nuclei. Deuterium is expected to be the primary fuel for fusion power plants.

DIATOMACEOUS EARTH (DIATOMITE): A fine siliceous material resembling chalk. Uses include waste water treatment plants to filter sewage effluent to remove solids. May also be used as inactive ingredients in pesticide formulations applied as dust or powder.

DIESEL OIL: Fuel used for internal combustion in diesel engines and space heating; usually that fraction which distills after kerosene.

DIFFUSED AIR: A type of sewage aeration. Air is pumped into the sewage through a perforated pipe.

DIGESTER: In a waste water treatment plant, a closed tank that decreases the volume of solids and stabilized raw sludge by bacterial action.

DIGESTION: The biochemical decomposition of organic matter. Digestion of sewage sludge takes place in tanks where the sludge decomposes, resulting in partial gasification, liquefaction and mineralization of pollutants.

DILUTION RATIO: The ratio of the volume of water of a stream to the volume of incoming waste. The capacity of a stream to assimilate waste is partially dependent upon the dilution ratio.

DIRECT CURRENT: An electric current that flows in only one direction through a circuit.

DISINFECTION: Effective killing by chemical or physical processes of all organisms capable of

causing infectious disease. Chlorination is the disinfection method commonly employed in sewage treatment processes to produce potable water.

DISPERSANT: A chemical agent used to break up concentrations of organic material. In cleaning oil spills, dispersants are used to disperse oil from the water surface.

DISSOLVED OXYGEN (DO): The oxygen dissolved in water or sewage. Adequately dissolved oxygen is necessary for the life of fish and other aquatic organisms and for the prevention of offensive odors. Low dissolved oxygen concentrations generally are due to discharge of excessive organic solids having high BOD, the result of inadequate waste treatment.

DISSOLVED SOLIDS: The total amount of dissolved material, organic and inorganic, contained in water or wastes. Excessive dissolved solids make water unpalatable for drinking and unsuitable for industrial uses, including cooling towers.

DISTILLATION: The removal of impurities from liquids by boiling. Steam condensed back into liquid, is almost pure water; the pollutants remain in the concentrated residue.

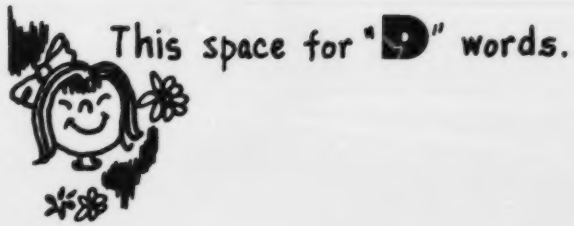
DISTRIBUTION: The act or process of distributing electric energy from convenient points on the transmission or bulk power system to the consumers.

DOSE: In radiology, the quantity of energy or radiation absorbed.

DOSIMETER (DOSEMETER): An instrument used to measure the amount of radiation a person has received.

DRAWDOWN: The distance that the water surface of a reservoir is lowered from a given elevation as the result of the withdrawal of water. Drawdown may refer to the maximum drawdown for power operation, from normal full pool to minimum power pool. Sometimes drawdown is also expressed in terms of acre-feet of storage withdrawn.

DREDGING: A method for deepening streams, swamps or coastal waters by scraping and removing solids from the bottom. The resulting mud is usually deposited in marshes in a process called filling. Dredging and filling can disturb natural ecological cycles. For example, dredging and filling destroy oyster beds and other aquatic life; filling can destroy the feeding and breeding grounds for many fish species.



DRY LIMESTONE PROCESS: A method of controlling air pollution caused by sulfur oxides. The polluted gases are exposed to limestone which combines with oxides of sulfur to form manageable residues.

DUMP: A land site where solid waste is disposed; or energy generated by water power that cannot be stored or conserved when such energy is beyond the immediate needs of the producing system.

DUST: Fine-grain particulate matter that is capable of being suspended in air.

DUSTFALL JAR: An open-mouthed container used to collect particles that fall out of the air. The particles are measured and analyzed.

DYSTROPHIC LAKES: Lakes between eutrophic and swamp stages of aging. Such lakes are shallow and have high humus content, high organic matter content, low nutrient availability and high BOD.

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ECOLOGICAL IMPACT: The total effect of an environmental change, either natural or man-made, on the ecology of the area.

ECOLOGY: The interrelationships of living things to one another and to their environment or the study of such interrelationships.

ECOLOGIC POISONS: Those chemicals used to control insects, rodents, plant diseases, weeds and other pests, and also to defoliate economic crops such as cotton.

ECOSPHERE: See **BIOSPHERE.**

ECOSYSTEM: The interacting system of a biological community and its nonliving environment.

EFFICIENCY: That percentage of the total energy content of a power plant's fuel which is converted into electricity. The remaining energy is lost to the environment as heat.

EFFLUENT: A discharge.

ELECTRIC CURRENT, HEATING EFFECT: When an electric current flows through a conductor of finite resistance, heat energy is continuously generated.

ELECTRICAL ENERGY: The energy associated with electric charges and their movements. Measured in watt hours or kilowat hours. One watt-hour equals 860 calories.

ELECTRODIALYSIS: A process that uses electrical current and an arrangement of permeable membranes to separate soluble minerals from water. Often used to desalinize salt or brackish water.

ELECTROMETER: Instrument for measuring voltage differences.

ELECTRON: One of the negatively charged particles that forms part of every atom.

ELECTRON VOLT (eV): A unit of energy equal to the kenetic energy gained by an electron as it moves through a potential difference of 1 volt.

ELECTRO-PROCESS INDUSTRY: An industry which requires very large amounts of electricity in manufacturing for heat or chemical processes (as distin-

guished from wheel-turning or mechanical applications). Examples are electric furnace steel, aluminum, chlorine, and plating.

ELECTROSTATIC PRECIPITATOR: An air pollution control device that removes particulate matter by imparting an electrical charge to particles in a gas stream for mechanical collection on an electrode of an opposing electrical charge.

EMERGENCY EPISODE: See **AIR POLLUTION EPISODE.**

EMISSION: See **EFFLUENT.** (Generally used in regard to discharges into air.)

EMISSION FACTOR: The average amount of a pollutant emitted from each type of polluting source in relation to a specific amount of material processed. For example, an emission factor for a blast furnace (used to make iron) would be a number of pounds of particulates per ton of raw materials.

EMISSION INVENTORY: A list of air pollutants emitted into a community's atmosphere, in amounts (usually tons) per day, by type of source. The emission inventory is basic to the establishment of emission standards.

EMISSION STANDARD: The maximum amount of a pollutant legally permitted to be discharged from a single source.

EMPHYSEMA: A respiratory disease, caused by pollutants in polluted air and cigarette smoke, that decreases the ability of the cilia to remove mucus from the respiratory tubes. As a result, walls between adjacent alveoli tear and groups of alveoli are replaced by large holes in the lungs.

ENERGY: That which does or is capable of doing work. It is measured in terms of the work it is capable of doing; electric energy is commonly measured in kilowatt-hours or average megawatts.

FIRM ENERGY: Electric energy which is considered to have assured availability to the customer to meet all or any agreed upon portion of his load requirements. Firm energy is based on certain specified probability considerations, which, in the Pacific Northwest, are related to the 1928-58 sequence of historical streamflows adopted for making system power regulations. System firm energy capability includes hydro system prime energy, thermal plant energy capabilities, and firm imports.

PRIME ENERGY: Hydroelectric energy which is assumed to be availabe 100 per cent of the time: specifically, the average energy generated during the critical period.

SECONDARY ENERGY: All hydroelectric energy other than prime energy: specifically, the difference between average annual energy and prime energy.

ENERGY CONTENT CURVE: A seasonal guide to the use of reservoir storage for at-site and downstream power generation. It is based on the following constraints: (1) During drawdown sufficient storage shall remain in the reservoir to insure meeting its share of the system firm energy requirements in the event of critical period water conditions, (2) Draft of storage for secondary energy production is permitted only to the extent that it will not jeopardize reservoir refill by the end of the coming July. Drafting below the assured refill level is permitted only if required to meet firm energy loads or if such draft is secured by a commitment to return energy equivalent to the drafted water if refill is not otherwise accomplished.

ENERGY MIX: The applied variable combinations of all energy sources in a locale or region. [e.g.: Electrical energy might be supplied by a mix of hydroelectric nuclear and fossil (oil, coal) fuels.]

ENRICHED URANIUM: Uranium in which the amount of the fissionable isotope, uranium-235, has been increased above the 0.7 percent contained in natural uranium.

ENRICHMENT: The addition of nitrogen, phosphorus and carbon compounds or other nutrients into a

lake or other waterway that greatly increases the growth potential for algae and other aquatic plants. Most frequently, enrichment results from the inflow of sewage effluent or from agricultural runoff.

ENVIRONMENT: The sum of all external conditions and influences affecting the life, development and, ultimately, the survival of an organism.
Everything that affects a living organism.

ENVIRONMENTAL IMPACT STATEMENT: A document describing the environmental impact of actions that may affect the quality of the human environment. Environmental impact statements are used as tools for decision-making.

EPA: Environmental Protection Agency.

EPIDEMIOLOGY: The study of diseases as they affect populations.

EROSION: The wearing away of the land surface by wind or water. Erosion occurs naturally from weather or runoff but is often intensified by man's land-clearing practices.

ESTUARIES: Areas where the fresh water meets salt water. For example, bays, mouths of rivers, salt marshes and lagoons. Estuaries are delicate ecosystems; they serve as nurseries, spawning and feeding grounds for a large group of marine life and provide shelter and food for birds and wildlife.

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EXOSPHERE: The outermost layer of the atmosphere.

EXPONENTIAL GROWTH: A quantity exhibits exponential growth when it increased by a constant percentage of the whole during a constant time period. A colony of bacteria in which each bacterium divides into 2 bacteria every 10 minutes grows exponentially.

Word discoveries that start with "**E**".

EUTROPHICATION: A condition in which the supply of nitrates and phosphates becomes so great that algae grow at an enormous rate.

EUTROPHICATICATION: The normally slow aging process by which a lake evolves into a bog or marsh and ultimately assumes a completely terrestial state and disappears. During eutrophication the lake becomes so rich in nutritive compounds, expecially nitrogen and phosphorus, that algae and other microscopic plant life become super-abundant, thereby "choking" the lake, and causing it eventually to dry up.

EUTROPHIC LAKES: Shallow lakes, weedchoked at the edges and very rich in nutrients. The water is characterized by large amounts of algae, low water transparency, low dissolved oxygen and high BOD.

EVAPORATION: The change from liquid to gas in which molecules escape from the surface of the liquid.

EVAPORATION PONDS: Shallow, artificial ponds where sewage sludge is pumped, permitted to dry and either removed or buried by more sludge.

EXCLUSION AREA: An area of ½ mile immediately surrounding a nuclear reactor where human habitation is prohibited to assure safety in the event of an accident.

FABRIC FILTERS: A device for removing dust and particulate matter from industrial emissions much like a home vacuum cleaner bag. The most common use of fabric filters is baghouse.

FAHRENHEIT: The temperature scale on which the freezing point of water is 32 degrees and the boiling point of water is 212 degrees.

FAHRENHEIT DEGREE: 1/180 of the difference between the temperature of melting ice and that of water boiling under standard (760mm.) atmospheric pressure.

FAST BREEDER REACTOR: A fission reactor in which the neutrons are traveling at high velocities. The principal nuclear reaction envisioned for most proposed fast breeders is conversion of nonfissionable U-238 to fissionable plutonium-239.

FECAL COLIFORM BACTERIA: A group of organisms common to the intestinal tracts of man and of animals. The presence of fecal coliform bacteria in water is an indicator of pollution and of potentially dangerous bacterial contamination.

FEEDLOT: A relatively small, confined land area for raising cattle. Although an economical method of fattening beef, feedlots concentrate a large amount of animal wastes in a small area. The excrement cannot be handled by the soil as it could be if the cattle were scattered on open range. In addition, runoff from feedlots contributes excessive quantities of nitrogen, phosphorus and potassium to nearby waterways, thus contributing to eutrophication.

FEN: A low-lying land area partly covered by water.

FERMENTATION: The action of fungi and bacteria that use solutions or suspensions or organic substances as food and break the organic substances down into smaller molecules.

FILLING: The process of depositing dirt and mud in marshy areas to create more land for real estate development. Filling can disturb natural ecological cycles. See **DREDGING.**

FILM BADGE: A piece of masked photographic film worn as a badge by nuclear workers to monitor exposure to radiation. Nuclear radiation darkens the film.

FILTRATION: The waste water treatment, the mechanical process that removes particulate matter by separating water from solid material usually by passing it through sand.

FIRM ENERGY: See **ENERGY**

FISSION: The splitting of an atomic nucleus by a subatomic particle (Free neutron), releasing energy.

FLOC: A clump of solids formed in sewage by biological or chemical action.

FLOCCULATION: In waste water treatment, the process of separating suspended solids by chemical creation of clumps or flocs.

FLUE GAS: A mixture of gases resulting from combustion and emerging from a chimney. Flue gas includes nitrogen oxides, carbon oxides, water vapor and often sulfur oxides or particulates.

FLUORIDES: Gaseous, solid or dissolved compounds containing fluorine, emitted into the air or water from a number of industrial processes. Fluorides in the air are a cause of vegetation damage and, indirectly, of livestock damage.

FLUME: A channel, either natural or man-made, which carries water.

FLY ASH: All solids, including ash, charred paper, cinders, dust, soot or other partially incinerated matter, that are carried in a gas stream.
Solid particles that escape from a fire in the smoke.

FOG: Liquid particles formed by condensation of vaporized liquids.

FOGGING: The application of a pesticide by rapidly heating the liquid chemical, thus forming very fine droplets with the appearance of smoke. Fogging is often used to destroy mosquitoes and blackflies.

FOOD CHAIN: A simple diagram showing how organisms feed on each other. In each link of the chain there is one organism. From the beginning of the food chain, the kinds of organisms are producer, herbivore, primary carnivore, and secondary carnivore, which may also be a top carnivore.

FOOD PYRAMID: A diagram that shows the feeding relationships in an area. The pyramid is made of several rectangles, one above another.

FOOD WASTE: Animal and vegetable waste result-

ing from the handling, storage, sale, preparation, cooking and serving of foods; commonly called garbage.

FOOD WEB: A pattern formed by lines that are drawn from each organism in a locality to the organisms it feeds on.

FOREBAY: The water behind a dam.

FOSSIL FUELS: Coal, oil, natural gas, and other fuels originating from geologic deposits of ancient plant and animal life and depending on oxidation for release of energy.
Petroleum oil, gas, and coal.

FUEL: A substance used to produce heat energy, chemical energy by combustion or nuclear energy by nuclear fission.

FUEL CELL: A device in which fuel and oxygen are combined to produce chemical energy that is converted directly into electricity.

FUEL CYCLE: The series of steps involved in supplying fuel for nuclear power reactors. It includes mining, refining, the original fabrication of fuel elements, their use in a reactor, chemical processing to recover the fissionable material remaining in the spent fuel, reenrichment of the fuel material, and refabrication into new fuel elements.

FUEL ELEMENT: A rod, tube, plate or other mechanical shape or form into which nuclear fuel is fabricated for use in a reactor.

FUEL REPLACEMENT ENERGY: Electric energy generated at a hydroelectric plant as a substitute for energy which would otherwise have been generated by a thermal-electric plant.

FUEL REPROCESSING: The processing of reactor fuel to recover the unused fissionable material.

FUME: Tiny solid particles commonly formed by the condensation of vapors of solid matter.

FUMIGANT: A pesticide that is burned or evaporated to form a gas or vapor that destroys pests. Fumigants are often used in buildings or greenhouses.

FUNGI: Small, often microscopic plants without chlorophyll. Some fungi infect and cause disease in plants or animals; other fungi are useful in stabilizing sewage or in breaking down wastes for

compost.

FUNGICIDE: A pesticide chemical that kills fungi or prevents them from causing diseases, usually on plants of economic importance. See **PESTICIDE.**

FUSE: A device which melts when too many electrons are flowing, thus breaking the circuit and acting as a warning device.

FUSION: The process in which two atomic nuclei combine to form a larger nucleus whose mass is less than the aggregate mass of the original nuclei. The lost mass appears as energy. Because of repulsive electrical forces between their protons nuclei will not combine unless they are traveling toward one another at tremendous velocities. Initiation of the process, therefore, requires very high temperatures. The formation of a heavier nucleus from two lighter ones with the attendant release of a large amount of energy.

The rest of this page is for "**F**" word discoveries.

GALVANOMETER: An instrument for detecting direct currents of electricity.

GAME FISH: Those species of fish sought by sports fishermen, for example, salmon, trout, black bass, striped bass, etc. Game fish are usually more sensitive to environmental changes and water quality degradation than "rough" fish.

GAMMA RAY: Waves of radiant nuclear energy. Of the three types of radiation, Gamma Rays carry the most energy and penetrating capability and are best stopped by dense materials such as lead.

GARBAGE: See **FOOD WASTE.**

GARBAGE DUMP: An area of land where refuse from a community is discarded.

GARBAGE GRINDING: A method of grinding food waste by a household disposal, for example, and washing it into the sewer system. Ground garbage then must be disposed of as sewage sludge.

GAS: The phase in which both the form and volume of a given amount of matter may change while the temperature and pressure remain the same.

GAS-COOLED REACTOR (GCR): A type of nuclear power reactor in which a gas, usually helium, flows through the reactor core, becomes heated, and then gives up its heat to produce steam in a separate vessel. The steam is then used to drive a turbine.

GAS TURBINE: An industrial jet engine complex where one or more engines drive electrical generators.

GASOLINE: Petrol. Mixture of hydrocarbons obtained from petroleum.

GEIGER COUNTER: An electrical device that detects the presence of radioactivity.

GENERATING STATION (GENERATING PLANT): A station at which are located prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, and/or nuclear energy into electric energy.

GENERATION: The act or process of producing electric energy from other forms of energy; also the amount of electric energy so produced.

GENERATOR: A device that converts heat or mechanical energy into electrical energy.

GEOTHERMAL: As applied to power generation, the use of heat energy obtained through the medium of hot water or steam coming from beneath the earth's surface.

GEOTHERMAL ENERGY: The heat energy available in the earth's subsurface. Heat energy in the crust of the earth believed to have been produced by natural radioactivity. The thermal gradient of the earth's crust is such that the temperature in a deep well or mine increases by about 1°F for each 100 feet of depth.

GERMICIDE: A chemical or agent that kills microorganisms such as bacteria and prevents them from causing disease. Such compounds must be registered as pesticides with EPA.

GLACIER: A layer of ice that covers part of the land and does not melt completely at any time of year.

GRAIN: A unit of weight equivalent to 65 milligrams or 2/1,000 of an ounce.

GRAIN LOADING: The rate of emission of particulate matter from a polluting source. Measurement is made in grains of particulate matter per cubic foot of gas emitted.

GREEN BELTS: Certain areas restricted from being used for roads, buildings and houses; they often serve as separating buffers between pollution sources and concentrations of population.

GREENHOUSE EFFECT: The heating effect of the atmosphere upon the earth. Light waves from the sun pass through the air and are absorbed by the earth. The earth then reradiates this energy as heat waves that are absorbed by the air, specifically by carbon dioxide. The air thus behaves like glass in a greenhouse, allowing the passage of light but not of heat. Thus many scientists theorize that an increase in the atmospheric concentration of CO_2 can eventually cause an increase in the earth's surface temperature.

GROSS HEAD: The difference of elevations between water surfaces of the forebay and tailrace under specified conditions. In this Appendix, gross head generally refers to the difference between normal full pool and average tailwater.

GROSS NATIONAL PRODUCT (GNP): The total market value of the goods and services produced by

the nation before the deduction of depreciation charges and other allowances for capital consumption; a widely used measure of economic activity.

GROUND COVER: Grasses or other plants grown to keep soil from being blown or washed away.

GROUND WATER: The supply of water under the earth's surface in an aquifer or soil that forms a natural reservoir.

GROUNDWATER RUNOFF: Groundwater that is discharged into a stream channel as spring or seepage water.

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HABITAT: The sum total of environmental conditions of a specific place that is occupied by an organism, a population or a community.

HALF-LIFE: The time it takes certain materials, such as persistent pesticides or radioactive isotopes, to lose half their strength. For example, the half-life of DDT is 15 years; the half-life of radium is 1,580 years.

HAMMERMILL: A broad category of highspeed equipment that uses pivoted or fixed hammers or cutters to crush, grind, chip or shred solid wastes.

HARD WATER: Water containing dissolved minerals such as calcium, iron and magnesium. The most notable characteristic of hard water is its inability to lather soap. Some pesticide chemicals will curdle or settle out when added to hard water.

HAZARDOUS AIR POLLUTANT: According to law, a pollutant to which no ambient air quality standard is applicable and that may cause or contribute to an increase in mortality or in serious illness. For example, asbestos, beryllium and mercury have been declared hazardous air pollutants.

HEAD: See **NET HEAD** and **GROSS HEAD**

HEAT: Energy possessed by a substance in the form of kinetic energy, usually measured in calories —in space heating by the British Thermal Unit. Heat is transmitted by conduction, convection or radiation.

HEAT ENERGY: Energy that causes an increase in the temperature of an object. It may change the object from solid to liquid or from liquid to gas.

HEAT EXCHANGER: Any device that transfers heat from one fluid (liquid or gas) to another or to the environment.

HEAT ISLAND EFFECT: An air circulation problem peculiar to cities. Tall buildings, heat from pavements and concentrations of pollutants create a haze dome that prevents rising hot air from being cooled at its normal rate. A self-contained circulation system is put in motion that can be broken by relatively strong winds. If such winds are absent, the heat island can trap high concentrations of pollutants and present a serious health problem.

HEAT PUMP: A machine for extracting heat from a fluid which is at a slightly higher temperature than its surroundings. A device which transfers heat from a colder to a hotter reservoir by the expenditure of

mechanical energy when the primary purpose is heating the hot reservoir rather than refrigerating the cool reservoir. A heat pump is a reversed refrigeration apparatus. Heat pumps are more efficient for residential heating than electrical resistive heating.

HEAT RATE: A measure of a thermal generating station efficiency, generally expressed as Btu per (net) kilowatt-hour. It is computed by dividing the total Btu content of the fuel burned (or of heat released from the nuclear reactor) by the resulting net kilowatt-hours generated.

HEAT SINK: Anything that absorbs heat; usually part of the environment, such as the air, a river, or outer space.

HEATING SEASON: The coldest months of the year.

HEAVY HYDROGEN: A kind of hydrogen that has one proton and one neutron in the nucleus of each atom and one electron in orbit around the nucleus.

HEAVY METALS: Metallic elements with high molecular weights. Such metals are often residual in the environment and exhibit biological accumulation. Examples include mercury, chromium, cadmium, arsenic and lead.

HEAVY WATER MODERATED REACTOR: A reactor that uses heavy water as its moderator. Heavy water is an excellent moderator and thus permits the use of inexpensive (unenriched) uranium as a fuel.

HEMOGLOBIN: The red colored substance that helps the red blood cells carry large amounts of oxygen.

HERBICIDE: A pesticide used to destroy or control the growth of only specific weeds, bush and other undesirable plants. See **PESTICIDE.**

HERBIVORE: An organism or animal that feeds on vegetation.

HETEROTROPHIC ORGANISM: Organisms dependent on organic matter for food.

HIGH-SULFUR COAL: Generally, coal that contains more than one percent of sulfur by weight.

HIGH DENSITY POLYETHYLENE: A material often

used in the manufacture of plastic bottles that produces toxic fumes if incinerated.

HIGH TENSION: High voltage.

HI-VOLUME SAMPLER: A device used in the measurement and analysis of suspended particulate pollution. Also called a Hi-Vol.

HORSE-POWER: British unit of power. 1 H.P. = 746 watts, or 42.408 BTU's per minute.

HOT: A colloquial term meaning highly radioactive, or containing an electrical charge.

HUMUS: Decomposed organic material in the soil.

HYDRO-: Prefix denoting water.

HYDROCARBONS: A vast family of compounds containing carbon and hydrogen in various combinations, found especially in fossil fuels. Some hydrocarbons are major air pollutants, some may be carcinogenic and others contribute to photochemical smog.

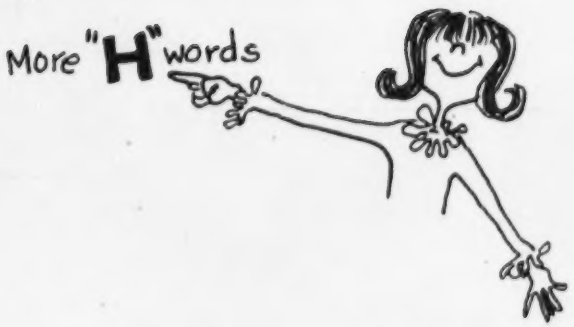
HYDROELECTRICITY: Electricity production by water-powered turbine generator.

HYDROELECTRIC PLANT: An electric power plant in which the turbine-generators are driven by falling water.

HYDROGEN SULFIDE (H_2S): A malodorous gas made up of hydrogen and sulfur with the characteristic odor of rotten eggs. It is emitted in the natural decomposition of organic matter and is also the natural accompaniment of advanced stages of eutrophication. H_2S is also a byproduct of refinery activity and the combustion of oil during power plant operations. In heavy concentrations, it can cause illness.

HYDROLOGY: The science dealing with the properties, distribution and circulation of water and snow.

H 40



ILLUMINATION OF A SURFACE: The amount of light falling per second on unit area of the surface. Measured in lumens per unit area.

IMPEDANCE: The rate at which a substance can absorb and transmit sound.

IMPLEMENTATION PLAN: A document of the steps to be taken to ensure attainment of environmental quality standards within a specified time period. Implementation plans are required by various laws.

IMPORTS: Energy forms imported from outside the region. Electrical power imported from outside the Columbia-North Pacific Region system.

IMPOUNDMENT: A body of water, such as a pond, confined by a dam, dike, floodgate or other barrier.

INCINERATION: The controlled process by which solid, liquid or gaseous combustible wastes are burned and changed into gases; the residue produced contains little or no combustible material.

INCINERATOR: A furnace for burning garbage and other refuse or a controlled apparatus used to burn waste substances and in which all the combustion factors—temperature, retention time, turbulence and combustion air— can be controlled.

INDEPENDENT RESOURCES (HYDROELECTRIC): The hydroelectric projects of the region which are not included in the Coordinated Columbia River System.

INDUSTRIAL REVOLUTION: The beginning of the system of mass producing most manufactured objects in large factories and distributing and selling them with the help of greatly improved transportation.

INERT GAS: A gas that does not react with other substances under ordinary conditions.

INERTIAL SEPARATOR: An air pollution control device that uses the principle of inertia to remove particulate matter from a stream of air or gas.

INFILTRATION: The flow of a fluid into a substance through pores or small openings. Commonly used in hydrology to denote the flow of water into soil material.

INFRARED: A kind of invisible radiation that carries less energy than light.

INOCULUM: Material such as bacteria placed in compost or other medium to initiate biological action.

INSECTICIDE: An insect poison.

INSTANTANEOUS PEAK: The maximum demand at the instant of greatest load, usually determined from the readings of indicating or graphic meters.

INSULATION: A substance that insulates is one that can slow down the flow of heat or sound.

INTEGRATED PEST CONTROL: A system of managing pests by using biological, cultural and chemical means.

INTERCEPTOR SEWERS: Sewers used to collect the flows from main and trunk sewers and carry them to a central point for treatment and discharge. In a combined sewer system, where street runoff from rains is allowed to enter the system along with sewage, interceptor sewers allow some of the sewage to flow untreated directly into the receiving stream, to prevent the sewage plant from being overloaded.

INTERCHANGE: Kilowatt-hours delivered to or received by one electric utility system from another in times of emergency or shortage for economic purposes. They may be returned in kind at a later time or may be accumulated as energy balances until the end of a stated period. Settlement may be by payment or on a pooling basis.

INTERNAL-COMBUSTION ENGINE: Energy is supplied by a burning fuel which is directly transformed into mechanical energy by controlled combustion.

INTERRUPTIBLE LOAD: Power made available under agreements which permit curtailment or cessation of delivery by the supplier.

INTERSTATE CARRIER WATER SUPPLY: A potable water supply aboard common carriers (planes, trains, buses and ships) operating interstate. Interstate carrier water supplies are regulated by the Federal Government.

INTERSTATE WATERS: According to law, waters defined as (1) rivers, lakes and other waters that flow across or form a part of State or international boundaries; (2) waters of the Great Lakes; (3) coastal waters—whose scope has been defined to include ocean waters seaward to the territorial limits and waters along the coastline (including inland streams) influenced by the tide.

INTERTIE: See **TRANSMISSION INTERCONNECTION.**

INVERSION: An atmospheric condition where a layer of cool air is trapped by a layer of warm air so that it cannot rise. Inversions spread polluted air horizontally rather than vertically so that contaminating substances cannot be widely dispersed. An inversion of several days can cause an air pollution episode.

IONIZATION: The process of adding one or more electrons to, or removing one or more electrons from, atoms or molecules, thereby creating ions. High temperatures, electrical discharges, or nuclear radiations can cause ionization.

IONIZATION CHAMBER: A device roughly similar to a Geiger counter that reveals the presence of ionizing radiation.

IRRADIATION: Exposure to radiation, as in a nuclear reactor.

ISOTOPE: A variation of an element having the same atomic number as the element itself, but having a different atomic weight because of a different number of neutrons. Different isotopes of the same element have different radioactive behavior.

JET FUEL: Fuel meeting requirements for use in jet engines and aircraft turbine engines, generally of kerosene or naphtha base components.

KEROSENE: The petroleum fraction containing hydrocarbons that are slightly heavier than those found in gasoline and naptha, with a boiling range between 180 and 300°C. Used today as fuel for gas turbines and jet engines.

KILOVOLT (KV): 1,000 volts.

KILOWATT [KW]: The unit of power equal to 1,000 watts, 3,413 BTU's or 1.341 horsepower. Roughly a power of 1 KW is capable of raising the temperature of a pound (pint) of water 1° F in one second.

KILOWATT-HOUR (KWH): The amount of work or energy delivered during the steady consumption of 1 kilowatt of power for a period of 1 hour, equivalent to 3,412 BTU's.

KINETIC ENERGY: A kind of energy that depends on an object's mass and speed.

A whole page just for "I-J-K" discoveries.

LAGOON: In waste water treatment, a shallow pond usually man-made where sunlight, bacterial action and oxygen interact to restore waste water to a reasonable state of purity.

LATERAL SEWERS: Pipes running underneath city streets that collect sewage from homes or businesses.

LC_{50}: Median lethal concentration, a standard measure of toxicity. LC_{50} indicates the concentration of a substance that will kill 50 percent of a group of experimental insects or animals.

LECHATE: Liquid that has percolated through solid waste or other mediums and has extracted, dissolved or suspended materials from it.

LEACHING: The process by which soluble materials in the soil, such as nutrients, pesticide chemicals or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water.

LEAD: A heavy metal that may be hazardous to human health if breathed or ingested.

LEUKEMIA: Cancer of the blood.

LIFE CYCLE: The phases, changes or stages an organism passes through during its lifetime.

LIFT: In a sanitary landfill, a compacted layer of solid waste and the top layer of cover material.

LIGHT ENERGY: The kind of energy that travels as visible radiation.

LIMITING FACTOR: A factor which controls species location and population size, such as shortage of water, food, etc.

LIMNOLOGY: The study of the physical, chemical, meteorological and biological aspects of fresh waters.

LINEAR ACCELERATOR: A long straight tube (or series of tubes) in which charged particles (ordinarily electrons or protons) gain in energy by the action of oscillating electro-magnetic fields.

LIQUEFIED NATURAL GAS (LNG): Natural gas that has been changed into a liquid by cooling to about -260°F (-160°C) at which point it occupies about 1/600 of its gaseous volume at normal atmospheric pressure, thus, the cost of shipping and storage is reduced.

LIQUEFIED PETROLEUM GAS (LPG): Consists of propanes and butanes recovered from natural gas and in petroleum refining and kept in a liquid state by pressure or refrigeration to facilitate handling. Its energy content ranges between 2,000 and 3,500 BTU per standard cubic feet. Sometimes called "bottle gas." Used widely as a fuel for internal combustion engines when pollution must be minimized and as a substitute for natural gas in areas not served by pipelines.

LIQUID: The phase in which an amount of unrestrained matter has a shape that can change, but a volume that does not change if the temperature and pressure remain the same.

LIQUID METAL REACTOR (LMR): A type of nuclear power reactor in which a liquid metal such as sodium flows through the reactor core, is heated, and delivers the heat to produce steam in a separate vessel containing water.

LOAD: The power and energy requirements of users on the electric power system in a designated area or the amount of power delivered to a given point.

BASE LOAD: The minimum load in a stated period of time.

FIRM LOAD: That part of the system load which must be met with firm power.

PEAK LOAD: Literally, the maximum load in a stated period of time. Sometimes the term is used in a general sense to describe that portion of the load above the base load.

LOAD DIVERSITY: The difference between (1) the sum of the separate peak loads of two or more load areas and (2) the actual coincident peak load of the combined areas which occurs when their annual peak loads occur in different seasons of the year.

LOAD FACTOR: The ratio of the average load over a designated period to the peak load occurring in that period. In this Glossary the term applies to annual load factor unless otherwise specified.

LOAD SHAPE (LOAD PATTERN): The characteristic variation in the magnitude of the power load with respect to time. This can be for a daily, weekly, or annual period.

LOSSES (ELECTRIC SYSTEM): Total electric energy loss in the electric system. It consists of trans-

mission, transformation, and distribution losses and unaccounted-for energy losses between sources of supply and points of delivery.

LOW SULFUR COAL AND OIL: Generally, coal or oil that contains one percent or less of sulfur by weight.

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MANTLE: The semisolid layer of the earth that is between the crust and the core.

MARSH: A low-lying tract of soft, wet land that provides an important ecosystem for a variety of plant and animal life.

MASKING: Covering over of one sound or element by another. Quantitatively, masking is the amount the audibility threshold of one sound is raised by the presence of a second masking sound. Also used in regard to odors.

MASS: A measure of the weight of matter in an object. The weight of an object depends on its mass.

MAXIMUM DEMAND: The greatest of all of the demands of the load under consideration which has occurred during a specified period of time.

MAXIMUM PLANT CAPABILITY (HYDRO): The maximum load which a hydroelectric plant can supply under optimum head and flow conditions without exceeding approved limits of temperature and stress. This may be less than the overload rating of the generators due to encroachment of tailwater on head at high discharges.

Mcf.: One thousand cubic feet.

MECHANICAL ENERGY: The kind of energy that is released to make objects move.

MECHANICAL TURBULENCE: The erratic movement of air caused by local obstructions such as buildings.

MEDIAN STREAM FLOW (MEDIAN HYDRO): The rate of discharge of a stream for which there are equal numbers of greater and lesser flow occurrences during a specified period.

MEGAWATT (MW): A unit of power equal to 1,000 kilowatts or 1 million watts.

MEGAWATT-HOUR (mwh): One thousand kilowatt-hours.

MEGAWATT MONTH: A unit of energy equal to one megawatt of power flowing continuously for an average month of 30.4 days or 730 hours.

MERCURY: A heavy metal, highly toxic if breathed or ingested. Mercury is residual in the environment, showing biological accumulation in all aquatic organisms, expecially fish and shell fish. Chronic exposure to airborne mercury can have serious effects on the central nervous system.

MESOSPHERE: The layer of the atmosphere between the stratosphere and the thermosphere. Air temperature decreases as the altitude increases within the mesosphere.

METHANE: Colorless, nonpoisonous and flammable gaseous hydrocarbon. Methane, (CH_4), is emitted by marshes and by dumps undergoing anaerobic decomposition.

mgd: Used to express rate of water flow in millions of gallons per day.

MICROBES: Minute plant or animal life. Some disease-causing microbes exist in sewage.

MIST: Liquid particles in air formed by condensation of vaporized liquids. Mist particles vary from 500 to 40 microns in size. By comparison, fog particles are smaller than 40 microns in size.

MIXED LIQUOR: A mixture of activated sludge and water containing organic matter undergoing activated sludge treatment in the aeration tank.

MOBILE SOURCE: A moving source of air pollution such as an automobile.

MODERATOR: A material, such as ordinary water, silver cadium, boron, or graphite, used in a reactor to slow down high velocity neutrons, thus decreasing the likelihood of further fission.

MOLECULE: The smallest part of a chemical compound that has the characteristics of the compound.

MONITORING: Periodic or continuous determination of the amount of pollutants or radioactive contamination present in the environment.

MUCK SOILS: Soils made from decaying plant materials.

MUCUS: A moist, sticky substance secreted by mucous cells.

MULCH: A layer of wood chips, dry leaves, straw, hay, or other material placed on the soil around

plants to retain moisture, to prevent weeds from growing and to enrich the soil.

NAPHTHA: Certain liquid hydrocarbon fractions recovered by the distillation of crude petroleum with a boiling point ranging from 125 to 246°C. Its principal uses are in solvents, paint thinners and as a raw material for the production of organic chemicals. It is expected to be used more and more as a raw material for the production of synthetic natural gas.

NASAL PASSAGES: The tubes and spaces leading from the nostrils to the pharynx.

NATURAL GAS: Naturally-occurring mixtures of hydrocarbon gases and vapors occurring naturally in certain geologic formation. It is usually found associated with oil. It is made up of about 60% to 80% methane, 5% to 9% ethane, 3% to 18% propane, and 2% to 14% heavier hydrocarbons such as butane, pentane and hexane. Some nonhydrocarbons such as nitrogen, carbondioxide, and hydrogen sulfide are sometimes present. Propane and the heavier hydrocarbons are usually removed and sold as liquefied petroleum gas. Pipeline natural gas is principally methane and has an energy content of 980 to 1,050 BTU per standard cubic foot.

NATURAL SELECTION: The natural process by which the organisms best adapted to their environment survive and those less well adapted are eliminated.

NECROSIS: Death of plant cells resulting in a discolored, sunken area or death of the entire plant.

NET HEAD (EFFECTIVE HEAD): The gross head less all hydraulic losses except those chargeable to the turbine .

NEUTRON: An electrically neutral particle with slightly more mass than a proton. All atomic nuclei except hydrogen-1 contain neutrons. Because neutrons have no electric charge they can wander freely through matter. Neutrons are not emitted in radioactive decay of atoms, but are emitted in both fission and fusion.

NITRIC OXIDE (NO): A gas formed in great part from atmospheric nitrogen and oxygen when combustion takes place under high temperature and high pressure, as in internal combustion engines. NO is not itself a pollutant; however, in the ambient air, it converts to nitrogen dioxide, a major contributor to photochemical smog.

NITROGEN DIOXIDE (NO_2): A compound produced

by the oxidation of nitric oxide in the atmosphere; a major contributor to photochemical smog.

NITROGENOUS WASTES: Wastes of animal or plant origin that contain a significant concentration of nitrogen.

NO: A notation meaning oxides of nitrogen. See **NITRIC OXIDE.**

NOISE: Any undesired audible signal. Thus, in acoustics, noise is an undesired sound.

NON-FIRM POWER: Power or power-producing capacity supplied or available under an arrangement which does not have the guaranteed continuous availability feature of firm power.

NTA: Nitrilotriacetic acid, a compound once used to replace phosphates in detergents.

NUCLEAR ELECTRIC POWERPLANT: One in which heat for raising steam is provided by fission rather than combustion of fossil fuel.

NUCLEAR ENERGY: Energy produced largely in the form of heat during nuclear reactions, which, with conventional generating equipment can be transformed into electric energy.

NUCLEAR (ATOMIC) FUEL: Material containing fissionable uranium of such composition and enrichment that when placed in a nuclear reactor will support a self-sustaining fission chain reaction and produce heat in a controlled manner for process use.

NUCLEAR POWER: Electric power produced from a power plant by converting the energy obtained from nuclear reaction.

NUCLEAR POWER PLANT: Any device, machine or assembly that converts nuclear energy into some form of useful power, such as mechanical or electrical power. In a nuclear electric power plant, heat produced by a reactor is generally used to make steam to drive a turbine that in turn drives an electric generator.

NUCLEAR REACTION: A reaction involving a change in an atomic nucleus, such as fission, fusion, neutron capture, or radioactive decay, as distinct from a chemical reaction, which is limited to changes in the electron structure surrounding the nucleus.

NUCLEAR REACTOR: A device in which a fission chain reaction can be initiated, maintained and controlled. Its essential component is a core with fissionable fuel. It usually has a moderator, a reflector, shielding, coolant and control mechanisms. Sometimes called an atomic furnace, it is the basic machine of nuclear energy.

NUCLEAR SUPERHEATING: Superheating the steam produced in a reactor by using additional heat from a reactor. Two methods are commonly employed: recirculating the steam through the same core in which it is first produced (integral superheating) or passing the steam through a second and separate reactor.

NUCLEUS: The central part of an atom.

NUTRIENT: Elements or compounds essential as raw material for organism growth and development, for example, carbon, oxygen, nitrogen and phosphorus. Classes of nutrients in food are carbohydrates, fats, proteins, vitamins, minerals and water.

Here's space for your "N" word discoveries.

OFF-PEAK: Energy supplied during periods of relatively low system demands as specified by the supplier.

OFFSHORE DRILLING: Drilling for oil off the shore of the coast.

OHM: A unit of measurement to gauge the resistance to the passage of electric current.

OHMMETER: An instrument that measures electrical resistance.

OIL SHALE: A sedimentary rock containing solid organic matter (kerogen) that yields substantial amounts of oil when heated to high temperatures.

OIL SPILL: The accidental discharge of oil into oceans, bays or inland waterways. Methods of oil spill control include chemical dispersion, combustion, mechanical containment and absorption.

OLIGOTROPHIC LAKES: Deep lakes that have a low supply of nutrients and thus contain little organic matter. Such lakes are characterized by high water transparency and high dissolved oxygen.

OMNIVORE: An animal whose food consists of both plant and animal matter.

OPACITY: Degree of obscuration of light. For example, a window has zero opacity; a wall is 100 percent opaque. The Ringelmann system of evaluating smoke density is based on opacity.

OPEN BURNING: The burning of wastes in an unconfined area.

OPEN DUMP: See **DUMP.**

ORGANIC: Referring to or derived from living organisms. In chemistry, any compound containing carbon.

ORGANIC COMPOUND: A compound having one or more carbon atoms in each molecule.

ORGANISM: Any living thing.

ORGANOPHOSPHATES: A group of pesticide chemicals containing phosphorus, such as malathion and parathion, intended to control insects. These compounds are short-lived and, therefore, do not normally contaminate the environment. However, some organophosphates, such as parathion, are

extremely toxic when initially applied, and exposure to them can interfere with the normal processes of the nervous system, causing convulsions and eventually death. Malathion, on the other hand, is low in toxicity and relatively safe for humans and animals; it is a common ingredient in household insecticide products.

OUTFALL: The mouth of a sewer, drain or conduit where an effluent is discharged into the receiving waters.

OUTPUT: The amount of power and energy delivered from a generating station or stations during a specified period.

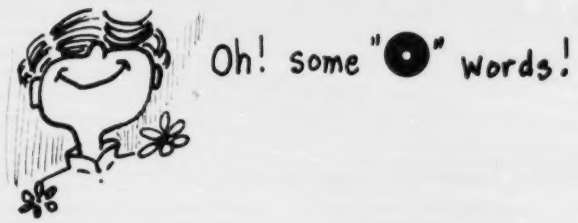
OVERFIRE AIR: Air forced into the top of an incinerator or boiler furnace to fan the flame.

OXIDANT: Any oxygen containing substance that reacts chemically in the air to produce new substances. Oxidants are the primary contributors to photochemical smog.

OXIDATION: A chemical reaction in which oxygen unites or combines with other elements. Organic matter is oxidized by the action of aerobic bacteria; thus oxidation is used in waste water treatment to break down organic wastes.

OXIDATION POND: A man-made lake or pond in which organic wastes are reduced by bacterial action. Often oxygen is bubbled through the pond to speed the process.

OZONE (O_3): The kind of oxygen that has three atoms in each molecule. A pungent, colorless, toxic gas. Ozone is one component of photochemical smog and is considered a major air pollutant.



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PACKAGE PLANT: Gas turbine electric generating facilities or a prefabricated or prebuilt waste water treatment plant.

PACKED TOWER: An air pollution control device in which polluted air is forced upward through a tower packed with crushed rock or wood chips while a liquid is sprayed downward on the packing material. The pollutants in the air stream either dissolve or chemically react with the liquid.

PAN: Peroxyacetyl nitrate, a pollutant created by the action of sunlight on hydrocarbons and nitrogen oxides in the air. Pans are an integral part of photochemical smog.

PARASITE: An organism that lives in or on another organism and harms it.

PARTICULATES: Finely divided solid or liquid particles in the air or in an emission. Particulates include dust, smoke, fumes, mist, spray and fog.

PARTICULATE LOADING: The introduction of particulates into the ambient air.

PATHOGENIC: Causing or capable of causing disease.

PCB's: Polychlorinated biphenyls, a group of organic compounds used in the manufacture of plastics. In the environment, PCB's exhibit many of the same characteristics as DDT and may, therefore, be confused with that pesticide. PCB's are highly toxic to aquatic life, they persist in the environment for long periods of time, and they are biologically accumulative.

PEAK LOAD: See **LOAD, PEAK**
Literally, the maxium load in a stated period of time. Somtimes the term is used in a general sense to describe that portion of the load above the base load.

PEAKING: Power plant operation to meet the highest portion of the daily load. See **LOAD, PEAK.**

PEAKING CAPABILITY: The maximum peak load that can be supplied by a generating unit, station, or system in a stated time period. For a hydroproject the peaking capability would be equal to the maximum plant capability only under favorable pool and flow conditions. Often the peaking capability may be less due to reservoir drawdown or tailwater encroachment.

PEAKING PLANT: A power plant which is normally

operated to provide all or most of its generation during maximum load periods.

PEAT: Partially decomposed organic material.

PENSTOCK: A conduit to carry water to the turbines of a hydroelectric plant (usually refers only to conduits which are under pressure).

PERCOLATION: Downward flow or infiltration of water through the pores or spaces of rock or soil.

PERSISTENT PESTICIDES: Pesticides that will be present in the environment for longer than one growing season or one year after application.

PESTICIDE: An agent used to control pests. This includes insecticides for use against harmful insects; herbicides for weed control; fungicides for control of plant diseases; rodenticides for killing rats, mice, etc.; and germicides used in disinfectant products, algaecides, slimicides, etc. Some pesticides can contaminate water, air or soil and accumulate in man, animals and the environment, particularly if they are misused. Certain of these chemicals have been shown to interfere with the reproductive processes of predatory birds and possibly other animals.

PESTICIDE TOLERANCE: A scientifically and legally established limit for the amount of chemical residue that can be permitted to remain in or on a harvested food or feed crop as a result of the application of a chemical for pest-control purposes. Such tolerances or safety levels, established federally by EPA, are set well below the point at which residues might be harmful to consumers.

PETROLEUM: A naturally-occurring material (gaseous, liquid, or solid) composed mainly of chemical compounds of carbon and hydrogen. Fractional distillation yields gasoline, diesel, lubricating oil and other products.

pH: A measure of the acidity or alkalinity of a material, liquid or solid. pH is represented on a scale of 0 to 14 with 7 representing a neutral state, 0 representing the most acid and 14, the most alkaline.

PHARYNX: The back of the throat.

PHASE: One of the forms of matter, including solid, liquid, and gas.

PHENOLS: A group of organic compounds that in very low concentrations produce a taste and odor

problem in water. In higher concentrations, they are toxic to aquatic life. Phenols are byproducts of petroleum refining, tanning and textile, dye and resin manufacture.

PHOSPHORUS: An element that while essential to life, contributes to the eutrophication of lakes and other bodies of water.

PHOTOCHEMICAL OXIDANTS: Secondary pollutants formed by the action of sunlight on the oxides of nitrogen and hydrocarbons in the air.

PHOTOCHEMICAL SMOG: Air pollution associated with oxidants rather than with sulfur oxide, particulates, etc. Produces necrosis, chlorosis and growth alterations in plants and is an eye and respiratory irritant in humans.
The pollution created when nitric oxide, hydrocarbons, and oxygen react in the sunshine.

PHOTOSYNTHESIS: The process by which some plants make food with the help of sunlight energy. The food is a sugar called glucose. Oxygen gas is also produced during photosynthesis.
The process in which sunlight falling on green plants causes carbon dioxide and water to be converted into more complex organic materials such as glucose.

PHYTOPLANKTON: The plant portion of plankton.

PHYTOTOXIC: Injurious to plants.

PLANKTON: The floating of weakly swimming plant and animal life in a body of water, often microscopic in size.

PLANT FACTOR: Same as **CAPACITY FACTOR.**

PLUME: The visible emission from a flue or chimney.

POINT SOURCE. In air pollution, a stationary source of a large individual emission, generally of an industrial nature. This is a general definition; point source is legally and precisely defined in Federal regulations. See **AREA SOURCE.**

POLLEN: A fine dust produced by plant flowers.

POLLUTANT: Any introduced gas, liquid or solid that makes a resource unfit for a specific purpose. Materials or energy that harm the surroundings, making them unfit or less suitable for man, other organisms, and non-living things.

POLLUTION: The presence of matter or energy whose nature, location or quantity produces undesired effects upon the normally existing environment.

POLYELECTROLYTES: Synthetic chemicals used to speed flocculation of solids in sewage.

PONDAGE: Reservoir power storage capacity of limited magnitude that provides only daily or weekly regulation of streamflow.

POOL REACTOR: A reactor in which the fuel elements are suspended in a pool of water that serves as the reflector, moderator, and coolant. Popularly called a swimming pool reactor, it is usually used for research and training at laboratories and universities.

POPULATION EXPOSION: A sharp increase in the rate at which a population grows.

POTABLE WATER: Water suitable for drinking or cooking purposes from both health and aesthetic considerations.

POTENTIAL ENERGY: The energy that an object has because of its position (height from which it can fall) or condition (stretched, twisted).

POWER: The rate at which work is done, therefore, the rate at which energy is transferred. Power is measured in units of work per unit of time. Typical units are the watt and the horsepower. (Note—the term is frequently used in a broad sense, as a commodity of capacity and energy, having only general association with classic or scientific meaning.)

POWER POOL: A network of high-voltage transmission lines connecting regional generating plants and making possible the exchange of power to meet variable supply and demand throughout the region.

POWER SUPPLY AREA: Geographic grouping of electric power supplies as established by the Federal Power Commission in accordance with utility service areas.

PPM: Parts per million. The unit commonly used to represent the degree of pollutant concentration

where the concentrations are small. Larger concentrations are given in percentages. Thus BOD is represented in ppm while suspended solids in water are expressed in percentages. In air, ppm is usually a volume/volume ratio; in water, a weight/volume ratio.

PRECIPITATE: A solid that separates from a solution because of some chemical or physical change or the formation of such a solid.

PRECIPITATORS: In pollution control work, any of a number of air pollution control devices usually using mechanical/electrical means to collect particulates from an emission.

PRESSURE VESSEL: A strong-walled container housing the core of most types of power reactors; it usually also contains a moderator, reflector, thermal shield, and control rods.

PRESSURIZED-WATER REACTOR(PWR): A type of nuclear power reactor in which water circulated through the core is kept under sufficient pressure to prevent boiling of the water. The heated reactor water passes through tubes which are surrounded with a vessel containing water which is allowed to be heated to steam which is then used to drive a turbine.

PRETREATMENT: In waste water treatment, any process used to reduce pollution load before the waste is introduced into a main sewer system or delivered to a treatment plant for substantial reduction of the pollution load.

PRIMARY CARNIVORE: A carnivore that eats herbivores.

PRIMARY TREATMENT: The first stage in waste water treatment in which substantially all floating or settleable solids are mechanically removed by screening and sedimentation.

PRIMATE: The group of animals including apes, monkeys and man.

PRIME ENERGY: Hydroelectric energy which is assumed to be available 100 percent of the time; specifically, the average energy generated during the critical period.

PROCESS WEIGHT: The total weight of all materials, including fuels, introduced into a manufacturing process. The process weight is used to calculate

the allowable rate of emission of pollutant matter from the process.

PRODUCER: A plant that can produce food by photosynthesis.

PROPANE: Inflammable gas obtained from petroleum or natural gas.

PROTON: An atomic particle that has a positive electric charge and has about 1800 times as much mass as an electron.

PUBLIC UTILITY DISTRICT: A potential subdivision (quasipublic corporation of a state) with territorial boundaries embracing an area wider than a single municipality and frequently covering more than one county for the purpose of generating, transmitting, and distributing electric energy.

PULVERIZATION: The crushing or grinding of material into small pieces.

PUMPED HYDROELECTRIC STORAGE: The only means now available for the large-scale storage of electrical energy. Excess electricity produced during periods of low demand is used to pump water up to a reservoir. When demand is high, the water is released to operate a hydroelectric generator. Pumped energy storage returns only about 66% of the electrical energy put into it, but costs less than an equivalent generating capacity.

PUMPED STORAGE PLANT: A hydroelectric power plant which generates electric energy for peak load use by utilizing water pumped into an elevated storage reservior during off-peak periods.

PUMPING STATION: A station at which sewage is pumped to a higher level. In most sewer systems pumping is unnecessary; waste water flows by gravity to the treatment plant.

PUTRESCIBLE: Capable of being decomposed by microorganisms with sufficient rapidity to cause nuisances from odors, gases, etc. For example, kitchen wastes or dead animals.

QUADRILLION BTU: 10^{15} (thousand million million) Btu's; equal to the heat value of 965 billion cubic feet of gas, 175 million barrels of oil, or 38 million tons of coal.

QUENCH TANK: A water-filled tank used to cool incinerator residues.

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This space is reserved for more "**P-Q**" words.

RAD: A unit of measurement of any kind of radiation absorbed by man.

RADIATION: A flow of pure energy or of high energy atomic particles or molecules.
The emission of fast atomic particles or rays by the nucleus of an atom. Some elements are naturally radioactive while others become radioactive after bombardment with neutrons or other particles. The three major forms of radiation are alpha, beta and gamma.

RADIATION MONITORING: Continuous or periodic determination of the amount of radiation present in a given area.

RADIATION STANDARDS: Regulations that include standards for exposure, permissible concentrations, and transportation of radioactive material.

RADIOACTIVITY: The spontaneous change of atomic nuclei from one nuclear species to another. Such changes are always accompanied by the emission of corpuscular or electromagnetic radiation or both. These emissions are called alpha, beta, and gamma radiations. Alpha radiations are positively charged helium nuclei (2 protons and 2 neutrons) having velocities from 5% to 7% that of light. Beta radiations are negatively and positively charged electrons which may have velocities up to about 99.9% of the speed of light. Gamma radiations are electromagnetic, thus, they are of the same nature as x-rays and light.

RADIOACTIVE ELEMENT: An element that gives off particles and energy as it changes to a different element.

RADIOBIOLOGY: The study of the principles, mechanisms and effects of radiation on living matter.

RADIOECOLOGY: The study of the effects of radiation on species of plants and animals in natural communities.

RADIOISOTOPES: Radioactive isotopes. Radioisotopes such as cobalt-60 are used in the treatment of disease.

RASP: A device used to grate solid waste into a more manageable material, ridding it of much of its odor.

RATE BASE: The value, specified by a regulatory

authority, upon which a utility is permitted to earn a specified rate of return.

RAW SEWAGE: Untreated domestic, commercial, or institutional waste water.

RECEIVING WATERS: Rivers, lakes, oceans or other bodies that receive treated or untreated waste waters.

RECYCLING: The collection and process by which waste materials are transformed into new products in such a manner that the original products may lose their identity.

RED TIDE: A proliferation or bloom of a certain type of plankton with red-to-orange coloration, that often caused massive fish kills. Though they are a natural phenomenon, blooms are believed to be stimulated by phosphorus and other nutrients discharged into waterways by man.

REFUSE: See **SOLID WASTE.**

REFUSE RECLAMATION: The collection and process of converting solid waste to saleable products. For example, the composting of organic solid waste yields a saleable soil conditioner.

REM: A measurement of radiation dose to the internal tissues of man.

REP: A unit of measurement of any kind of radiation absorbed by man.

REGULATING RESERVOIR: A reservoir located downstream from a hydroelectric peaking plant having sufficient pondage to store the widely fluctuating discharges from the peaking plant and release them in a relatively uniform manner downstream.

RESERVES: The amount of a natural resource expected to be recovered by present-day techniques and under present economic conditions.

SPINNING RESERVE: Generating capacity connected to the bus and ready to take load. It also includes capacity available in generating units which are operating at less than their capacity.

SYSTEM RESERVE CAPACITY: The difference between the available dependable capacity of the system, including net firm power purchases, and the actual or anticipated peak load for the specified period.

RESERVOIR: A pond, lake, tank or basin, natural or man-made, used for the storage, regulation and control of water.

RESERVOIR CAPACITY: The usable volume of a reservoir available for the storage and release of water for power generation.

RESIDUAL FUEL OIL: Crude petroleum or viscous residuum obtained in refinery operation.

RESOURCE RECOVERY: The process of recovering unused and reuseable materials or energy, particularly from solid waste.

RESOURCES: The estimated total quantity of a natural resource such as mineral in the ground; includes prospective undiscovered mineral reserves.

RESPIRATION: The process by which organisms release energy from glucose by breaking it down into smaller molecules.

RESPIRATORY SYSTEM: The breathing system, consisting mainly of the lungs and the tubes that lead to them.

REVERBERATION: The persistence of sound in an enclosed space after the sound source has stopped.

RINGELMANN CHART: A series of illustrations ranging from light grey to black used to measure the opacity of smoke emitted from stacks and other sources. The shades of grey simulate various smoke densities and are assigned numbers ranging from one to five. Ringelmann No. 1 is equivalent to 20 percent dense; No. 5 is 100 percent dense. Ringelmann charts are used in the setting and enforcement of emission standards.

RIPARIAN RIGHTS: Rights of a land owner to the water on or bordering his property, including the right to prevent diversion or misuse of upstream water.

RIVER BASIN: The total area drained by a river and its tributaries.

RODENTICIDE: A poison used to destroy or prevent damage by rats or other rodent pests. See **PESTICIDE.**

ROUGH FISH: Those fish species considered to be of poor fighting quality when taken on tackle or of poor eating quality; for example, gar, suckers, etc. Most rough fish are more tolerant of widely changing environmental conditions than are game fish.

RUBBISH: A general term for solid waste—excluding food waste and ashes—taken from residences, commercial establishments and institutions.

RULE CURVE: A seasonal guide to the use of reservoir storage.

RUN-OF-CANAL PLANT: A hydroelectric plant similar to a run-of-river plant but located on an irrigation canal or waterway instead of a stream.

RUN-OF-RIVER PLANT: A hydroelectric plant which depends chiefly on the flow of a stream as it occurs for generation, as opposed to a storage project, which usually has sufficient storage capacity to carry water from one season to another. Some run-of-river projects have a limited storage capacity (pondage) which permits them to regulate streamflow on a daily or weekly basis.

SAFETY ROD: A standby control rod used to shut down a nuclear reactor rapidly in emergencies.

SALINITY: The degree of salt in water.

SALT WATER INTRUSION: The invasion of salt water into a body of fresh water, occurring in either surface or groundwater bodies. When this invasion is caused by oceanic waters, it is called sea water intrusion.

SALVAGE: The utilization of waste materials.

SANITATION: The control of all the factors in man's physical environment that exercise or can exercise a deleterious effect on his physical development, health and survival.

SANITARY LANDFILL: A site for solid waste disposal using sanitary landfilling techniques.

SANITARY LANDFILLING: An engineered method of solid waste disposal on land in a manner that protects the environment; waste is spread in thin layers, compacted to the smallest practical volume and covered with soil at the end of each working day.

SANITARY SEWERS: Sewers that carry only domestic or commercial sewage. Storm water runoff is carried in a separate system. See **SEWER.**

SAPROPHYTE: A plant that feeds on dead organic material from either plants or animals.

SCAVENGER: An animal that eats dead animals that it has not killed or garbage containing food value.

SCRAM: The sudden shutdown of a nuclear reactor, usually by rapid insertion of the safety rods. Emergencies or deviations from normal reactor operation cause the reactor operator or automatic control equipment to scram the reactor.

SCRAP: Discarded or rejected materials that result from manufacturing or fabricating operations and are suitable for reprocessing.

SCREENING: The removal of relatively coarse floating and suspended solids by straining through racks or screens.

SCRUBBER: An air pollution control device that uses a liquid spray to remove pollutants from a gas stream by absorption or chemical reaction. Scrubbers also reduce the temperature of the emission.

SECONDARY CARNIVORE: A carnivore that eats other carnivores.

SECONDARY ENERGY: All hydroelectric energy other than prime energy; specifically, the difference between average annual energy and prime energy.

SECONDARY RECOVERY: Any method of augmenting the natural energy of a petroleum reservoir to maintain or increase production.

SECONDARY TREATMENT: Waste water treatment, beyond the primary stage, in which bacteria consume the organic parts of the wastes. This biochemical action is accomplished by use of trickling filters or the activated sludge process. Effective secondary treatment removes virtually all floating and settleable solids and approximately 90 percent of both BOD_5 and suspended solids. Customarily, disinfection by chlorination is the final stage of the secondary treatment process.

SEDIMENTATION: In waste water treatment, the settling out of solids by gravity.

SEDIMENTATION TANKS: In waste water treatment, tanks where the solids are allowed to settle or to float as scum. Scum is skimmed off; settling solids are pumped to incinerators, digesters, filters or other means of disposal.

SELECTIVE HERBICIDE: A pesticide intended to kill only certain types of plants, especially broadleafed weeds, and not harm other plants such as farm crops or lawn grasses. The leading herbicide in the United States is 2,4-D. A related but stronger chemical used mostly for brush control on range, pasture, and forest lands and on utility or highway right-of-way is 2,4,5-T. Uses of the latter chemical have been somewhat restricted because of laboratory evidence that it or a dioxin contaminant in 2,4,5-T can cause birth defects in test animals.

SENESCENCE: The process of growing old. Sometimes used to refer to lakes nearing extinction.

SEPTIC TANK: An underground tank used for the deposition of domestic wastes. Bacteria in the wastes decompose the organic matter, and the sludge settles to the bottom. The effluent flows through drains into the ground. Sludge is pumped out at regular intervals.

SETTLEABLE SOLIDS: Bits of debris and fine matter heavy enough to settle out of waste water.

SETTLING CHAMBER: In air pollution control, a low-cost device used to reduce the velocity of flue gases usually by means of baffles, promoting the settling of fly ash.

SETTLING TANK: In waste water treatment, a tank or basin in which settleable solids are removed by gravity.

SEWAGE: The total of organic waste and waste water generated by residential, institutional, or commercial establishments.

SEWAGE LAGOON: See **LAGOON.**

SEWER: Any pipe or conduit used to collect and carry away sewage or stormwater runoff from the generating source to treatment plants or receiving streams. A sewer that conveys household and commercial sewage is called a sanitary sewer. If it transports runoff from rain or snow, it is called a storm sewer. Often storm water runoff and sewage are transported in the same system or combined sewers.

SEWERAGE: The entire system of sewage collection, treatment and disposal. Also applies to all effluent carried by sewers whether it is sanitary sewage, industrial wastes or storm water run-off.

SHEILD: An enclosure or barrier that protects workers from harmful radiation released by radioactive materials.

SHORT TON: A unit of weight that equals 20 short hundredweights or 2,000 avoirdupois pounds. Used chiefly in the United States, in Canada, and the Republic of South Africa. (USBM, Dictionary of mining, mineral, and related terms.)

SILT: Finely divided particles of soil or rock. Often carried in cloudy suspension in water and eventually deposited as sediment.

SINKING: A method of controlling oil spills that employs an agent to entrap oil droplets and sink them to the bottom of the body of water. The oil and sinking agent are eventually biologically degraded.

SKIMMING: The mechanical removal of oil or scum from the surface of water.

SLUDGE: The (formation) construction of solids removed from sewage during waste water treatment. Sludge disposal is then handled by incineration,

dumping or burial.

SMOG: Generally used as an equivalent of air pollution, particularly associated with oxidants.

SMOKE: Solid particles generated as a result of the incomplete combustion of materials containing carbon.

SNOWPACK: The winter accumulation of snow in mountain areas which will melt and run off into streams and rivers.

SO_X: A symbol meaning oxides of sulfur.

SOFT DETERGENTS: Biodegradable detergents.

SOIL CONDITIONER: A biologically stable organic material such as humus or compost that makes soil more amenable to the passage of water and to the distribution of fertilizing material, providing a better medium for necessary soil bacteria growth.

SOIL EROSION: The removal of soil from the land by the action of water or wind.

SOLAR CELL: An electric cell which converts radiant energy from the sun into electrical energy.

SOLAR ENERGY: Radiation energy from the sun falling upon the earth's surface.

SOLID: The phase in which neither the shape nor volume of a given amount of matter changes if the temperature and pressure remain the same.

SOLID WASTE: Useless, unwanted or discarded material with insufficient liquid content to be free flowing. Also see **WASTE.**

(1) Agricultural—solid waste that results from the raising and slaughtering of animals and the processing of animal products and orchard and field crops.

(2) Commercial—waste generated by stores, offices and other activities that do not actually turn out a product.

(3) Industrial—waste that results from industrial processes and manufacturing.

(4) Institutional—waste originating from educational, health care and research facilities.

(5) Municipal—residential and commercial solid waste generated within a community.

(6) Pesticide—the residue from the manufacturing, handling or use of chemicals intended for killing plant and animal pests.

(7) Residential—waste that normally originates in

a residential environment. Sometimes called domestic solid waste.

SOLID WASTE DISPOSAL: The ultimate disposition of refuse that cannot be salvaged or recycled.

SOLID WASTE MANAGEMENT: The purposeful, systematic control of the generation, storage, collection, transport, separation, processing, recycling, recovery and disposal of solid wastes.

SOLUTION: A mixture in which molecules (or smaller particles) of each substance are spread evenly among the particles of the other substance.

SOLVENT: A substance that can dissolve a different substance.

SONIC BOOM: The booming sound produced as a supersonic jet airplane exceeds the speed of sound, and the shock wave reaches the ground.

SOOT: Agglomerations of tar-impregnated carbon particles that form when carbonaceous-material does not undergo complete combustion. Generally appears as a black, greasy substance that escapes from a fire in the smoke.

SORPTION: A term including both adsorption and absorption. Sorption is basic to many processes used to remove gaseous and particulate pollutants from an emission and to clean up oil spills.

SOUND ENERGY: A kind of energy carried by molecules that vibrate back and forth, so that waves are formed.

SPENT (DEPLETED) FUEL: Nuclear reactor fuel that has been irradiated (used) to the extent that it can no longer effectively sustain a chain reaction.

SPILL: The discharge of water through gates, spillways, or conduits which bypass the hydroelectric plant's turbines; or the accidental release of any material.

SPOIL: Dirt or rock that has been removed from its original location.

SPORE: A thick-walled cell that can live even when conditions are bad. Many kinds of plants and some single-celled animals form spores. Some organisms reproduce by means of spores.

STABLIZATION: The process of converting active organic matter in sewage sludge or solid wastes into

inert, harmless material.

STABLIZATION PONDS: See **LAGOON, OXIDATION POND.**

STABLE AIR: An air mass that remains in the same position rather than moving in its normal horizontal and vertical direction. Stable air does not disperse pollutants and can lead to high buildups of air pollution.

STACK: A smokestack; a vertical pipe or flue designed to exhaust gases and suspended particulate matter.

STACK EFFECT: The upward movement of hot gases in a stack due to the temperature difference between the gases and the atmosphere.

STAGNATION: Lack of wind in an air mass or lack of motion in water. Both cases tend to entrap and concentrate pollutants.

STANDARD CUBIC FOOT (SCF): The amount of gas contained in a volume of 1 cubic foot under a pressure of 1 atmosphere (14.73 pounds per square inch) at a temperature of 60°F.

STATIONARY SOURCE: A pollution emitter that is fixed rather than moving as an automobile.

STEAM-ELECTRIC PLANT: A plant in which the prime movers (turbines) connected to the generators are driven by steam.

STEAM ENGINE: A machine which is powered by steam. It can be either turbine or reciprocating.

STORAGE PROJECT: A project with a reservoir of sufficient size to carryover from the high-flow season to the low-flow season and thus to develop a firm flow substantially more than the minimum natural flow. A storage project may have its own power plant or may be used only for increasing generation at downstream plants.

STORM SEWER: A conduit that collects and transports rain and snow runoff back to the ground water. In a separate sewage system, storm sewers are entirely separate from those carrying domestic and commercial waste water.

STRATIFICATION: Separating into layers.

STRATOSPHERE: The layer of the atmosphere between the troposphere and the mesosphere.

Temperature increases as the altitude increases in the stratosphere.

STREAM FLOW: The quantity of water passing a given point in a stream or river in a given period of time, usually expressed in cubic feet per second.

STRIP MINING: A process in which rock and top soil strata overlying ore or fuel desposits are scraped away by mechanical shovels. Also know as surface mining.

SUBBITUMINOUS COAL: Coal of rank intermediate between lignite and bituminous; weathering and nonagglomerating coal having calorific values in the range 83,000—13,000 BTU, calculated on a moist, mineral-matter-free basis. (American Society for Testing Materials, D338-38).

SUBCRITICAL MASS: An amount of fissionable material insufficient in quantity or of improper geometry to sustain a fission chain reaction.

SUBSTATION: A substation is an assemblage of equipment for the purpose of switching and/or changing or regulating the voltage of electricity.

SULFUR DIOXIDE (SO_2): A heavy, pungent, colorless gas formed primarily by the combustion of fossil fuels. SO_2 damages the respiratory tract as well as vegetation and minerals and is considered a major air pollutant.

SUMP: A depression or tank that serves as a drain or receptacle for liquids for salvage or disposal.

SURFACTANT: An agent used in detergents to cause lathering. Composed of several phosphate compounds, surfactants are a source of external enrichment thought to speed the eutrophication of our lakes.

SURPLUS: Energy generated that is beyond the immediate needs of the producing system. This energy is frequently obtained from spinning reserve and sold on an interruptible basis.

SURVEILLANCE SYSTEM: A monitoring system to determine environmental quality. Surveillance systems should be established to monitor all aspects of progress toward attainment of environmental standards and to identify potential episodes of high pollutant concentrations in time to take preventive action.

SUSPENDED SOLIDS (SS): Small particles of solid pollutants in sewage that contribute to turbidity and

tnat resist separation by conventional means. The examination of suspended solids and the BOD test constitute the two main determinations for water treatment facilities.

SYNERGISM: The cooperative action of separate substances so that the total effect is greater than the sum of the effects of the substances acting independently.

SYNTHETIC: Man-made.

SYNTHETIC LIQUID FUEL: Liquid hydrocarbon material produced from solid carbonaceous material, such as oil shale.

SYNTHETIC NATURAL GAS (SNG): Gas produced from conversion of some carbonaceous material, such as coal, naptha, crude oil, residual oils, etc. It contains 90% methane, and has an energy content of 980 to 1,035 BTU per standard cubic foot, about that of natural gas.

SYSTEMIC PESTICIDE: A pesticide chemical that is carried to other parts of a plant or animal after it is injected or taken up from the soil or body surface.

"S" word discoveries will go here.

TAILINGS: Second grade or waste material derived when raw material is screened or processed.

TAILWATER: The water surface immediately downstream from a dam or hydroelectric powerplant.

TAR SAND: Any sedimentary material that contains bitumen or other heavy petroleum material that cannot be recovered by conventional petroleum recovery methods.

TEMPERATURE: A measure of the kinetic energy of the molecules and smaller particles in an object. An object with a higher temperature can give up heat to an object with a lower temperature.

TEMPERATURE INVERSION: A condition in which a layer of warmer air lies above a layer of cooler air that is close to the earth's surface.

TERTIARY TREATMENT: Waste water treatment beyond the secondary or biological stage that includes removal of nutrients such as phosphorus and nitrogen, and a high percentage of suspended solids. Tertiary treatment, also known as advanced waste treatment, produces a high quality effluent.

THERMAL BREEDER REACTOR: A breeder reactor in which the fission chain reactor is sustained by thermal neutrons.

THERMAL EFFICIENCY: The ratio of the electric power produced by a power plant to the amount of heat produced by the fuel; a measure of the efficiency with which the plant converts thermal to electrical energy.

THERMAL PLANT: A generating plant which converts heat energy to electrical energy. Such plants may burn coal, gas, oil, or use nuclear energy to produce thermal energy.

THERMAL POLLUTION: Degradation of water quality by the introduction of a heated effluent. Primarily a result of the discharge of cooling waters from industrial processes, particularly from electrical power generation.

THERMAL SHIELD: A layer or layers of high density material located within a reactor pressure vessel or between the vessel and the biological shield to reduce radiation heating in the vessel and the biological shield.

THERMONUCLEAR REACTION: A reaction in which

very high temperatures allow the fusion of two light nuclei to form the nucleus of a heavier atom, releasing a large amount of energy.

THERMOSPHERE: The layer of atmosphere between the mesosphere and the exosphere. Temperature increases as the altitude increases in the thermosphere.

THERMOSTAT: An instrument employed to maintain a constant temperature.

THRESHOLD DOSE: The minimum dose of a given substance necessary to produce a measurable physiological or psychological effect.

TOLERANCE: The relative capability of an organism to endure an unfavorable environmental factor, i.e. the amount of a chemical considered safe on any food to be eaten by man or animals. Also see **PESTICIDE TOLERANCE.**

TOP CARNIVORE: A secondary carnivore that almost no other animal can kill.

TOPOGRAPHY: The configuration of a surface area including its relief, or relative elevations, and the position of its natural and man-made features.

TOXICANT: A substance that kills or injures an organism through its chemical or physical action or by altering its environment; for example, cyanides, phenols, pesticides or heavy metals. Especially used for insect control

TOXICITY: The degree of being poisonous or harmful to plant or animal life.

TRACHEA: Part of the respiratory system, the single tube leading downward through the neck from the pharynx to the bronchi.

TRANSFORMER: A machine which can increase or decrease the voltage of an alternating current.

TRANSMISSION: The act or process of transporting electric energy in bulk from a source or sources of supply to other utility systems.

TRANSMISSION INTERCONNECTION (INTERTIE): Transmission circuit used to tie or interconnect two normally independent utility service areas to two utility systems.

TRANSMISSION LINES: Wires or cables through which high voltage electric power is moved from point to point.

TRICKLING FILTER: A device for the biological or secondary treatment of waste water consisting of a bed of rocks or stones that support bacterial growth. Sewage is trickled over the bed enabling the bacteria to break down organic wastes.

TRITIUM: A form of hydrogen atoms whose nuclei contain 1 proton and 2 neutrons. Tritium is radioactive with a half-life of 12.4 years and spontaneously changes to helium-3 with the emission of a negative beta particle. Tritium is expected to be used as one of the fuel sources in fusion power plants.

TROPOSPHERE: The layer of the atmosphere extending seven to ten miles above the earth. Vital to life on earth, it contains clouds and moisture that reach earth as rain or snow. Temperature decreases as altitude increases in the troposphere. Storms and vertical air currents and clouds occur almost entirely in the troposphere.

TURBIDIMETER: A device used to measure the amount of suspended solids in a liquid.

TURBIDITY: A thick, hazy condition of air due to the presence of particulates or other pollutants, or the similar cloudy condition in water due to the suspension of silt or finely divided organic matter.

TURBINE: A motor, the shaft of which is rotated by a stream of water, steam, air, or fluid from a nozzle and forced against blades of a wheel.

TURBOGENERATOR: An electric generator powered by a gas jet or steam turbine engine. The steam is created by heat from combustible materials (coal, oil, natural gas or other) or from a heat source beneath the earth's surface (geothermal).

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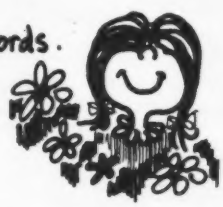

ULTIMATE DEVELOPMENT: The maximum or total development contemplated for a generating installation.

ULTIMATE PLANT CAPABILITY (Hydro): The maximum plant power producing capability of a hydroelectric plant when all contemplated generating units have been installed.

ULTRAVIOLET: A kind of invisible radiation that carries more energy than light.

URBAN RUNOFF: Storm water from city streets and gutters that usually contains a great deal of litter including organic and bacterial wastes.

USABLE ENERGY: All available and usable hydroelectric energy which can be derived for meeting system firm and secondary loads. It is possible that on occasion there will not be a market for all of the secondary energy which could be generated, in years of abundant water supply, and some of the water may have to be diverted over project spillways and the energy wasted.

VAPOR: The gaseous phase of substances that normally are either liquids or solids at atmospheric temperature and pressure; for example, steam and phenolic compounds.

VAPOR PLUME: The stack effluent consisting of flue gas and moisture made visible when the moisture is condensed into droplets or mist.

VAPORIZATION: The change of a substance from a liquid or solid state to the gaseous state. One of three basic contributing factors to air pollution, the others are attrition and combustion.

VARIANCE: Sanction granted by a governing body for delay or exception in the application of a given law, ordinance or regulation.

VECTOR: Disease vector—a carrier, usually an arthropod, that is capable of transmitting a pathogen from one organism to another.

VOLATILE: Evaporating readily at a relatively low temperature.

VOLT: Unit of force pressure which moves electrical energy through a conductor.

VOLTAGE: The amount of force employed to move a quantity of electricity, measured in volts.

VOLTMETER: The instrument for measuring the amount of force present at a given time expressed in volts.

Add any "V" words you discover in this space.

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WASTE: Also see **SOLID WASTE.**

(1) Bulky waste—Items whose large size precludes or complicates their handling by normal collection, processing or disposal methods.

(2) Construction and demolition waste—Building materials and rubble resulting from construction, remodeling, repair and demolition operations.

(3) Hazardous waste—Wastes that require special handling to avoid illness or injury to persons or damage to property.

(4) Special waste—Those wastes that require extraordinary management.

(5) Wood pulp waste—Wood or paper fiber residue resulting from a manufacturing process.

(6) Yard waste—Plant clippings, prunings and other discarded material from yards and gardens. Also known as yard rubbish.

WASTE, RADIOACTIVE: Equipment and fuel from nuclear operations which are radioactive. Wastes are generally classified as high-level (having radioactivity concentrations of hundreds of thousands of curies per gallon or cubic foot), lowlevel (in the range of 1 microcurie per gallon or cubic foot), or intermediate-level (between these extremes).

WASTE WATER: Water carrying wastes from homes, businesses, industries and institutions that is a mixture of water and dissolved or suspended solids.

WATER POLLUTION: The addition of sewage, industrial and institutional wastes or other harmful or objectionable material to water in concentration or in sufficient quantities to result in measurable degradation of water quality.

WATER QUALITY CRITERIA: The levels of pollutants that affect the suitability of water for a given use. Generally, water uses are classified as: public water supply; recreation; propagation of fish and other aquatic life; agricultural; and industrial.

WATER QUALITY STANDARD: A plan for water quality management containing four major elements: the use (recreation, drinking water, fish and wildlife propagation, industrial or agricultural) to be made of the water; criteria to protect those uses; implementation plans (for needed industrial-municipal waste treatment improvements) and enforcement plans; and an anti-degradation statement to protect existing high quality waters.

WATERSHED: The area drained by a given stream.

WATER SUPPLY SYSTEM: The system for the collection, storage, treatment and distribution of potable water from the sources of supply to the consumer.

WATER TABLE: The upper level of ground water.

WATER VAPOR: Water in the form of a gas.

WATT (W): A unit of measure for electric power equal to the transfer of 1 joule of energy per second. The watt is the unit of power most often associated with electricity. (1 horsepower = 746 watts). Determined by multiplying required volts by required amperes (volts x amps).

WATT HOUR: The amount of electricity used by one watt in one hour. A 100 watt light bulb will use 100 watt-hours of electricity every hour it is in use.

WORK: Work is done when a force is used to move an object any distance. The amount of work done is the product of force and distance. The metric unit of work is the joule (J.) When a force of 1 neutron is exerted through a distance of 1 meter, 1 joule of work is done.

ZOOPLANKTON: Planktonic animals that supply food for fish.

"W," "X," "Y" & "Z"

word discoveries can go on this and the next page.

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"W, X, Y, Z" words

CONVERSION FACTORS OF ENERGY / POWER

The conversion factors listed were furnished by the National Bureau of Standards, United States Department of Commerce. They are calculated on the following assumptions:

(1) The joule and watt for which values are given are the absolute electrical units adopted on January 1, 1948. For comparison with the international electrical units used prior to this date the conversion factor is 1 international joule or watt = 1.000 165 absolute joule or watt.

(2) The standard value for the acceleration of gravity is taken as 980.665 centimeters per second per second (32.17 feet per second per second). For consistency this value is used for both metric and English units. It makes the horsepower equal to 745.7 absolute watts instead of the round value of 746 watts commonly used in engineering practice.

(3) The gram-calory and British thermal unit for which values are given are the International Steam tables calory and International Steam tables. To obtain the thermochemical calory the conversion factor is 1 International Steam tables calory = 1.000 654 thermochemical calory.

ENERGY

Basic cgs unit = 1 erg
1 erg = 1 dyne-centimeter
= 624 000 000 000 electron-volts

1 joule (absolute) = 10 000 000 ergs
= 0.101 97 kilogram-meter
= 10 197 gram-centimeters
= 1 watt-second
= 0.001 kilowatt-second
= 0.000 000 277 78 kilowatt hour
= 0.000 277 78 watt-hour
= 0.001 341 02 horsepower-second
= 0.000 000 372 505 horsepower-hour
= 0.000 947 8 Btu
= 0.000 238 85 kilogram-calory
= 0.737 56 foot-pound

1 foot pound = 13 558 200 ergs
= 1.355 8 joules
= 0.138 255 kilogram-meter
= 13 825.5 gram-centimeters
= 0.001 355 8 kilowatt-second
= 0.000 000 376 6 kilowatt-hour
= 0.000 376 6 watt-hour
= 0.001 818 18 horsepower-second
= 0.000 000 505 05 horsepower-hour
= 0.001 285 1 Btu
= 0.000 323 8 kilogram-calory

1 kilogram-meter = 98 066 500 ergs
= 9.806 65 joules
= 100 000 gram-centimeters
= 0.009 806 65 kilowat-second
= 0.000 002 724 1 kilowatt-hour
= 0.002 724 1 watt-hour
= 0.012 151 horsepower-second
= 0.000 003 653 horsepower-hour
= 0.009 295 Btu
= 0.002 342 3 kilogram-calory

1 kilogram-calory = 1 000 gram-calories
= 4 186.7 joules
= 3.968 3 Btu
= 3 088 foot-pounds
= 426.93 kilogram-meters
= 1.163 0 watt-hours
= 0.001 163 0 kilowatt-hour
= 0.001 559 6 horsepower-hour

1 British thermal unit (Btu) = 10 550 000 000 ergs
= 1 055.0 joules
= 107.58 kilogram-meters
= 0.000 293 07 kilowatt-hour
= 0.293 07 watt-hour
= 0.000 393 01 horsepower-hour
= 778.156 foot-pounds
= 0.252 0 kilogram-calory

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1 watt-hour = 36 000 000 000 ergs
= 3 600 joules
= 367.1 kilogram-meters
= 3.6 kilowatt-seconds
= 0.001 kilowatt-hour
= 4.827 6 horsepower-seconds
= 0.001 341 0 horsepower-hour
= 3.412 Btu
= 0.859 85 kilogram-calory

1 watt-second = 1 joule

1 kilowatt-second = 1 000 joules

1 kilowatt-hour = 36 000 000 000 000 ergs
= 3 600 000 joules
= 367 100 kilogram-meters
= 3 600 kilowatt-seconds
= 1 000 watt-hours
= 4 827.6 horsepower-seconds
= 1.341 0 horsepower-hours
= 3 412 Btu
= 859.85 kilogram-calories
= 2 655 000 foot-pounds

1 megawatt-hour = 1 000 kilowatt-hours
= 1 000 000 watt-hours

1 kilomegawatt-hour = 1 000 000 kilowatt-hours
= 1 000 000 000 watt-hours

1 horsepower-second = 745.7 joules
= 76.040 kilogram-meters
= 0.000 207 14 kilowatt-hour
= 0.207 14 watt-hour
= 550 foot-pounds

1 horsepower-hour = 2 684 500 joules
= 273 745 kilogram-meters
= 0.745 7 kilowatt-hour
= 2 544.5 Btu
= 641.197 kilogram-calories

QUADERGY

1 kilovar-hour = 1 reactive kilovolt-ampere-hour

1 megavar-hour = 1 000 kilovar-hours

APPARENT ENERGY

1 megavolt-ampere-hour = 1 000 kilovolt-ampere-hours

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POWER

Basic cgs unit = 1 erg per second = 0.000 000 1 watt

1 foot-pound per second = 8.296 3 kilogram-meters per minute
= 1.355 8 watts
= 0.001 355 8 kilowatt
= 0.001 818 18 horsepower
= 60 foot-pounds per minute

1 kilogram-meter per minute = 0.163 44 watt
= 0.0
= 0.000 219 18 horsepower

1 Btu per minute = 17.584 watts
= 0.017 584 kilowatt
= 0.023 580 5 horsepower

1 watt = 100 000 000 ergs per second
= 1 joule per second
= 10 197.2 gram-centimeters per second
= 0.101 972 kilogram-meter per second
= 0.001 kilowatt
= 0.001 341 0 horsepower

watts = volts x amperes x cos angle of lag or lead

volt-amperes = volts x amperes
= watts ÷ cos angle of lag or lead

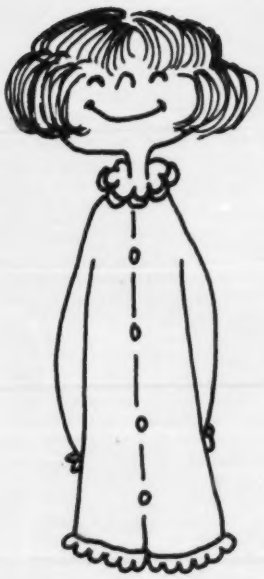
1 horsepower = 7 457 000 000 ergs per second
= 4 562.4 kilogram-meters per minute
= 76.040 kilogram-meters per second
= 745.7 watts
= 0.745 7 kilowatt
= 42.408 Btu per minute
= 550 foot-pounds per second
= 33 000 foot-pounds per minute
= 1.013 87 metric horsepower

1 kilowatt = 10 000 000 000 ergs per second
= 6 118 kilogram-meters per minute
= 101.972 kilogram-meters per second
= 1 000 watts
= 1.341 0 horsepower
= 56.87 Btu per minute
= 737.56 foot-pounds per second

1 watt-hour per second = 3 600 watts
= 3.6 kilowatts

1 kilowatt-hour per minute = 60 kilowatts

1 kilowatt-hour per second = 3 600 kilowatts



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1 horsepower-hour per minute = 60 horsepower

1 megawatt = 1 000 000 watts
= 1 000 kilowatts

1 kilomegawatt = 1 000 000 000 watts
= 1 000 000 kilowatts
= 1 000 megawatts

REACTIVE POWER

1 kilovar = 1 reactive kilovolt-ampere

1 megavar = 1 000 kilovars

APPARENT POWER

1 Megavolt-ampere = 1 000 kilovolt-amperes

MISCELLANEOUS

1 ampere = unit of current

1 volt = unit of voltage

1 coulomb = unit of quantity of electricity

1 lumen = unit of luminous flux

1 foot-candle = unit of illumination = 10.76 lux
= 1 lumen per square foot

1 lux = unit of illumination = 0.092 90 foot-candle
= 1 lumen per square meter

1 billion = 1 000 000 000

1 acre-foot = unit of volume in a reservoir
= 43 560 cubic feet
= 1 233 cubic meters
= 325 851 U.S. gallons
= 0.5042 second-foot day

1 second-foot (1 cfs) = unit of flow
= 1 cubic foot per second
= 0.028 32 cubic meters per second
= 7.480 5 gallons per second
= 723.97 acre-feet per year

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(Class A and Class B Utilities)	45 cents per copy.
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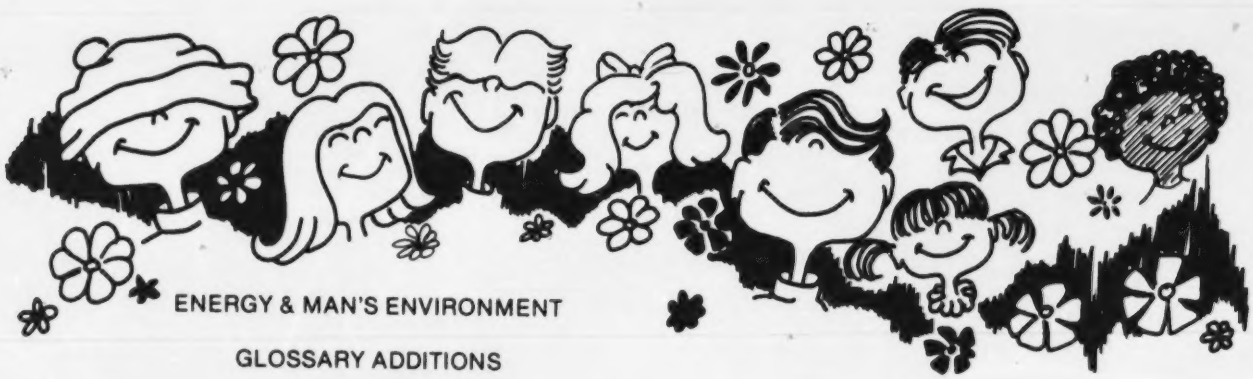

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